



INDIAN AGRICULTURAL  
RESEARCH INSTITUTE, NEW DELHI.

**I. A. R. I. 6.**

MGIPC—SI —6 AR/54—7-7-54—10,000.





Vol. 9. No. 1. pp. 1-58

January, 1939



# THE VETERINARY BULLETIN

1939

WEYBRIDGE :  
IMPERIAL BUREAU OF ANIMAL HEALTH  
WEYBRIDGE, SURREY  
ENGLAND

# Imperial Agricultural Bureaux.

---

## EXECUTIVE COUNCIL.

---

LT.-COL GEORGE P. VANIER, D.S.O., M.C., <i>Chairman</i>	...	Canada.
F. J. du TOIT, <i>Vice-Chairman</i>	... ..	South Africa.
SIR DONALD FERGUSSON, K.C.B.	... ..	United Kingdom.
F. L. McDOUGALL, C.M.G.	... ..	Australia.
NEVILL L. WRIGHT, F.I.C., D.I.C.	... ..	New Zealand.
J. M. ADAMS, F.R.C.Sc. (I)	... ..	Fire.
SHAMALDARI LAL, I.C.S., Deputy High Commissioner	...	India.
D. JAMES DAVIES, C.B.E.	... ..	Newfoundland.
B. F. WRIGHT...	... ..	Southern Rhodesia.
J. A. CALDER	... ..	Colonies, Protectorates and Mandated Territories.
SIR DAVID CHADWICK, K.C.M.G., C.S.I., C.I.F.	... ..	Secretary

---

## STAFF OF IMPERIAL BUREAU OF ANIMAL HEALTH, WEYBRIDGE.

---

### *Director:*

W. HORNER ANDREWS, D.Sc., M.R.C.V.S.

*Deputy Director and  
Editor of The Veterinary Bulletin and of Index Veterinarius:*

W. A. POOL, M.R.C.V.S.

### *Second Officer:*

J. TWEEDALE EDWARDS, M.R.C.V.S.





# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
<b>DISEASES CAUSED BY BACTERIA AND FUNGI</b> ... ..	1-10	<b>DISEASES, GENERAL :</b>	
Anthrax ... ..	1	[General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms] ...	29-35
Tuberculosis ... ..	3		
Pasteurella infection ... ..	5		
Paratyphoid infection ... ..	6		
Brucella infection ... ..	7		
Anaerobic infection ... ..	10		
<b>DISEASES CAUSED BY PROTOZOAN PARASITES</b> ... ..	10-15	<b>NUTRITION IN RELATION TO DISEASE :</b>	
Trypanosomiasis ... ..	10	[Articles placed in the section " Diseases, General " may also contain references to nutritional factors] ... ..	36-42
Various ... ..	13	Mineral deficiency ... ..	36
		Avitaminosis ... ..	40
<b>DISEASES CAUSED BY VIRUSES</b> ... ..	16-23	<b>PUBLIC HEALTH</b> ... ..	42
Foot and mouth disease ... ..	16	<b>THERAPEUTICS</b> ... ..	42-47
Various ... ..	18	<b>POISONS AND POISONING</b> ... ..	48
<b>PARASITES IN RELATION TO DISEASE [GENERAL]</b> ... ..	24	<b>PHYSIOLOGY</b> ... ..	48-51
<b>PARASITES IN RELATION TO DISEASE [ARTHROPODS]</b> ... ..	24-25	<b>TECHNIQUE AND APPARATUS</b> ... ..	51-54
<b>PARASITES IN RELATION TO DISEASE [HELMINTHS]</b> ... ..	25-27	<b>MISCELLANEOUS</b> ... ..	54-56
<b>IMMUNITY [INCLUDING ALLERGIC AND SEROLOGICAL DIAGNOSIS]</b> ... ..	27-29	<b>REPORTS</b> ... ..	56-57
		Great Britain ... ..	56
		Germany ... ..	57
		Italian Somaliland ... ..	57
		<b>BOOK REVIEWS</b> ... ..	57-58

# INDEX TO AUTHORS

- Addington, L. H. See Cunningham, O. C., jt. author, 4.  
 Albien, 52.  
 Alden, L. A., 38.  
 Andrews, C. H. See Schlesinger, M., jt. author, 22.  
 Antignac, J. F. A., 36.  
 Appenzeller, W., 53.  
 Arenas Martorell, R., Pereira Pérez, R., & Wahlmeier, A., 25.  
 Askew, H. O., & Maunsell, P. W., 37.  
 Ask-Upmark, E., 22.  
 Aubert. See Combiesco, D., et al., jt. authors, 2.  
 Baill, J. See Remlinger, P., jt. author, 18.  
 Bardach, M. See Bridré, J., jt. author, 20.  
 Barnard, J. E., & Welch, F. V., 52.  
 Bechdel, S. I. See Guerrant, N. B., et al., jt. authors, 41.  
 Becker, H. See Wohlfiel, T., jt. author, 6.  
 Béclère, A., 20.  
 Berens, C. See Chapman, G. H., et al., jt. authors, 1.  
 Berg, W. N., 5.  
 Bertrand. See Rubay, jt. author, 46.  
 Besredka, A., & Gross, L., 22.  
 Bilek, F., 49.  
 Birch, I. W., György, P., & Harris, I. J., 40.  
 Bird, H. R., & Oleson, J. J., 39.  
 Blaizot, L., 21.  
 Blanc, G., & Martin, L. A., 21, *bis*.  
 Bloch, F. See Costil, J., jt. author, 5.  
 Blount, W. P., 48.  
 Bohstedt, G. See Phillips, P. H., jt. author, 40.  
 Boley, L. E. See Sampson, J., et al., jt. authors, 37.  
 Boquet, A., & Saenz, A., 1.  
 Boquet, P., 27.  
 —. See also Cesari, E., jt. author, 20.  
 Bosworth, T. J., 9.  
 Bouchet, A. See Bouchet, G., jt. author, 48.  
 Bouchet, G., & Bouchet, A., 48.  
 Bradshaw, M. W., 33.  
 von Brand, T., 12.  
 Brandly, C. A. See Graham, R., et al., jt. authors, 7.  
 Bridré, J., & Bardach, M., 20.  
 Broom, J. C. See Hoare, C. A., jt. author, 12.  
 Brumley, O. V., 58.  
 Bullard, J. F. See Doyle, L. P., jt. author, 34.  
 Burnet, F. M., Keogh, E. V., & Lush, D., 23.  
 Bussabarger, R. A., Freeman, S., & Ivy, C. A., 39.  
 Butozan, V., 32.  
 Cesari, E., & Boquet, P., 20.  
 Chapman, G. H., Berens, C., Nilson, E. L., & Cörbo, L. G., 1.  
 Cucca, A., 4.  
 Clapham, P. A., 26.  
 Combiesco, D., Stamatesco, & Aubert, 2.  
 Cornell Vet., 8.  
 Costil, J., & Bloch, F., 5.  
 Cottral, G. E., 25.  
 Craige, A. H. See Klein, L. A., et al., jt. authors, 43.  
 Cruveilhier, L. See Nicolau, S., et al., jt. authors, 18.  
 Culbertson, J. T., 12.  
 —, & Kolodny, M. H., 13.  
 Cunningham, O. C., & Addington, L. H., 4.  
 Curasson, G., 30.  
 Curcio, L. G. See Chapman, G. H., et al., jt. authors, 1.  
 Curley, E. M., & Herring, F. G., 26.  
 Curtis, O. F. See Sutherland, G. F., jt. author, 34.  
 Datta, S. C. A., 29.  
 Dau, W., 51.  
 Dauscher, G., 55.  
 Davis, C. L., Stiles, G. W., & McGregor, A. N., 14.  
 Davis, C. R., 6.  
 Dayus, C. V., 10.  
 Dean, H. R., 28.  
 Deaneley, R., & Parkes, A. S., 47.  
 Dechambre, E. See Urban, A., jt. author, 4.  
 Dietrich, S., & Oettel, H., 46.  
 Dixon, J. K., 37.  
 Doyle, L. P., & Bullard, J. F., 34.  
 Duncan, C. W. See Huffman, C. F., jt. author, 37.  
 Dunlap, G. L. See Graham, R., et al., jt. authors, 7.  
 Eccles, A., Longley, E. O., & Thomson, J. K., 16.  
 Edgar, G. See Rose, A. L., jt. author, 10.  
 Edwards, J. T. See Hulse, E. C., jt. author, 16.  
 Elvehjem, C. A., & Koehn, C. J., Jr., 40.  
 Emerson, G. A. See Telford, I. R., et al., jt. authors, 41.  
 Engel, D., 47.  
 Enigk, K., 27.  
 Evans, H. M. See Telford, I. R., et al., jt. authors, 41.  
 Fedotov, A. I., 49.  
 Ferguson, W. S., Lewis, A. H., & Watson, S. J., 38.  
 Fitch, L. W. N., 35.  
 Fox, C. L. See Ottenberg, R., jt. author, 43.  
 Freeborn, S. B. See Regan, W. M., jt. author, 45.  
 Freeman, S. See Bussabarger, R. A., et al., jt. authors, 39.  
 French, M. H., 11.  
 Garrod, L. P., 44.  
 Germany, 55, *bis*, 57.  
 Ghinelli, I., 9.  
 Gibson, R. B., & Lowe, R. C., 51.  
 Gilbert, S. J., 7.  
 Girard, A. See Levaditi, C., et al., jt. authors, 44.  
 Glaser, R. W., 23.  
 Gordon, R. F. See Townson, W. K., jt. author, 48.  
 Gortner, R. A. See Jackson, S. M., jt. author, 50.  
 Gousseff, W. F., 15.  
 Graham, R., Brandly, C. A., & Dunlap, G. L., 7.  
 —. See also Sampson, J., et al., jt. authors, 37.  
 Great Britain, 56.  
 Greenwood, D. A., Hewitt, E. A., & Nelson, V. E., 47.  
 Greder, H., 26, 27.  
 Guder, R. See Stenmetzer, K., jt. author, 46.  
 Guerrant, N. B., Morck, R. A., Bechdel, S. I., & Hilston, N. W., 41.  
 György, P. See Birch, I. W., et al., jt. authors, 40.  
 Hadwen, S., 35.  
 Hagemann, P. K. H., 52, *bis*.  
 Harris, L. J. See Birch, I. W., et al., jt. authors, 40.  
 Hart, G. H., 36.  
 Harwood, P. D., Underwood, P. C., & Schaffer, J. M., 45.  
 Heidelberg, M., 29.  
 Halm, R., 44.  
 D'Herelle, F., 57.  
 Herring, F. G. See Curley, E. M., jt. author, 26.  
 Hettche, 28.  
 Hewitt, E. A. See Greenwood, D. A., et al., jt. authors, 47.  
 Hilston, N. W. See Guerrant, N. B., et al., jt. authors, 41.  
 Hines, H. M. See Knowlton, G. C., jt. author, 41.  
 Hinshaw, W. R., 31.  
 Hoare, C. A., & Broom, J. C., 12.  
 Hole, N. H., 35.  
 Holmes, C. E. See Wilson, H. F., jt. author, 48.  
 Hopkirk, C. S. M., & Grimmer, R. E. R., 38.  
 Hornby, H. E., 10.  
 Huffman, C. F., & Duncan, C. W., 37.  
 Hulse, E. C., & Edwards, J. T., 16.  
 Hunter, A. H., 55.  
 Itabashi, K., Watanabe, S., Ito, S., Tajime, Y., & Otaki, K., 8.  
 —. See also Watanabe, S., et al., jt. authors, 8.  
 Italian Somaliland, 57.  
 Ito, S. See Itabashi, K., et al., jt. authors, 8.  
 —. See also Watanabe, S., et al., jt. authors, 8.  
 Ivancic, M., 15.  
 Ivanov, B. J., 18.  
 Ivanova-Jobzev, P. S., 14.  
 Ivy, C. A. See Bussabarger, R. A., et al., jt. authors, 39.  
 Jackson, C. H. N., 24.  
 Jackson, S. M., & Gortner, R. A., 50.  
 Jadaszohn, Uehninger & Margot, 51.  
 Jakusev, N. I., 46.  
 J. Amer. vet. med. Ass., 31.  
 Jannun, F., 54.  
 Je Jesus, Z., 24.  
 J. Minst. Agric., 16.  
 Johnen, F. J., 32.  
 Johnson, C. M., 13.  
 Johnson, H. W., & Miller, W. T., 43.  
 Jones, C. P. See Joyner, A. I., jt. author, 52.  
 Josland, S. V., & McNaught, K. J., 37.  
 Joyner, A. I., & Jones, C. P., 52.  
 Kalinnikov, V. G., 28.  
 Kalwaryski, M. H. E., 53.  
 Kamberis, E., 14.  
 Karsten, 32.  
 Keogh, E. V. See Burnet, F. M., et al., jt. authors, 23.  
 Kergel, G., 51.  
 Kerr, W. R., & Lamont, H. G., 13.  
 Kirshner, A. See Southwell, T., jt. author, 58.  
 Kleckner, A. L. See Klein, L. A., et al., jt. authors, 43.  
 Klein, L. A., Scheidy, S. F., Kleckner, A. L., & Craig, A. H., 43.  
 Knoop, C. E., Kraus, W. E., Sutton, T. S., & Washburn, R. G., 37.  
 Knowlton, G. C., & Hines, H. M., 41.  
 Köbe, K., 30.  
 —. See also Waldmann, O., jt. author, 17.  
 Koehn, C. J., Jr. See Elvehjem, C. A., jt. author, 40.  
 Kolbe, F., 32.  
 Kolodny, M. H. See Culbertson, J. T., jt. author, 13.  
 Kon, S. Z. See Temple, P. L., jt. author, 53.  
 Kopciowska, L. See Nicolau, S., et al., jt. authors, 18.  
 Krampe, 32.  
 Krause, C., 35.  
 Kraus, W. E. See Knoop, C. E., et al., jt. authors, 37.  
 Krumwiede, E., & Kuttner, A. G., 6.  
 Kuttner, A. G. See Krumwiede, E., jt. author, 6.  
 Lafenêtre, H., 14.  
 Lamont, H. G. See Kerr, W. R., jt. author, 13.  
 Lancet, 52.  
 László, F., 33, 34.  
 LeBlanc, T. J., 56.  
 Leitch, R. H., 56.  
 Lépine, P., & Sautter, V., 18.  
 Levaditi, C., Girard, A., Vaismann, A., Ray, A., & Richard, G., 44.  
 Lewis, A. H. See Ferguson, W. S., et al., jt. authors, 38.

# Index

- Lignières, R., 18.  
Longley, E. O. See Eccles, A., et al., jt. authors, 18.  
Lowe, P. C. See Gibson, R. B., jt. author, 51.  
Lühre, E., 45.  
Lush, D. See Burnet, F. M., et al., jt. authors, 23.  
McCance, R. A., 38.  
McCoy, O. R., 43.  
McEwen, A. D., 7, bis.  
McGregor, A. N. See Davis, C. L., et al., jt. authors, 14.  
McIlwaine, J. E., 33.  
McNaught, K. J. See Josland, S. W., jt. author, 37.  
Madagascar, 56.  
di Marco, R., 6.  
Margot. See Jadassohn, et al., jt. authors, 51.  
Martin, L. A., 10.  
— See also Blanc, G., jt. author, 21, bis.  
Maunsell, P. W. See Askew, H. O., jt. author, 37.  
Metzgen, H. J., & Morrison, H. B., 36.  
Millenbruck, E. L., 9.  
Miller, W. T. See Johnson, H. W., jt. author, 43.  
Mintscheff, P., 34.  
Monet, P., 44.  
Morck, R. A. See Guerrant, N. B., et al., jt. authors, 41.  
Morrison, H. B. See Metzgen, H. J., jt. author, 36.  
Moses, A., 21.  
Moutaux, 29.  
Mullen, A. L., 29.  
Néls, P., 28.  
Nelson, V. E. See Greenwood, D. A., et al., jt. authors, 47.  
Neseni, R., 50.  
Nicolau, S., Criveilhuer, L., & Koprowska, L., 18.  
Nikolskii, M., 31.  
Nilson, E. L. See Chapman, G. H., et al., jt. authors, 1.  
Norway, 55.  
Oettel, H. See Dietrich, S., jt. author, 46.  
Oldham, J. N., 26.  
O'erson, J. J. See Bird, H. R., jt. author, 39.  
Orr, W., 32.  
Oswald, B., 25.  
Otaki, K. See Itabashi, K., et al., jt. authors, 8.  
Ottenberg, R., & Fox, C. L., Jr., 43.  
Overbeck, F., 33.  
Pallaske, G., 3.  
Panassenko, F. T., 45.  
Parkes, A. S. See Deanesley, R., jt. author, 47.  
Peck, E. F., 38.  
Pereira Pérez, R. See Arenas Martorell, R., et al., jt. authors, 25.  
Phillips, P. H., & Bohstedt, G., 40.  
Pisacka-Zeyland, E., 4.  
Pigoury, L., 15.  
Pochon, J., 1.  
Prein, W., 33.  
Pritchett, H. D., 18.  
Pullar, E. M., 52.  
Ravaglia, F., 57.  
Ray, A. See Levaditi, C., et al., jt. authors, 44.  
Regan, W. M., & Freehorn, S. B., 45.  
Reschle, H. S., 35.  
Renlinger, P., & Bailly, J., 18.  
Richard, G. See Levaditi, C., et al., jt. authors, 44.  
Richardson, U. F., 54.  
Robertson, D., 26.  
Robyn, G., 2, bis.  
Roemmele, O., 50.  
Romijn, C. See Roos, J., jt. author, 49.  
Roos, J., & Romijn, C., 49.  
Rose, A. L., & Edgar, G., 10.  
Rott, 5.  
Rowlands, W. T., 30.  
Rubay & Bertrand, 46.  
Rubli, H., 27.  
Sabini, A. B., 22.  
Sacchi, R., 24.  
van Saceghem, R., 10.  
Saenz, A. See Boquet, A., jt. author, 1.  
Sampson, J., Boley, L. E., & Graham, R., 37.  
Sautter, V. See Lépine, P., jt. author, 18.  
Schäper, W., & Weischer, F., 31.  
Schaffer, J. M. See Harwood, P. D., et al., jt. authors, 45.  
Scheidy, S. F. See Klein, L. A., et al., jt. authors, 43.  
Schlesinger, M., & Andrewes, C. H., 22.  
Schlothauer, C. F., 19.  
Schmidt, W., 44.  
Schoop, G., 27.  
Schürmann, E. See Selter, H., jt. author, 3.  
Scorgie, N. J., 40.  
— See also Stadelorth, A. W., jt. author, 43.  
Seiferle, E., 50.  
Selter, H., & Schürmann, E., 3.  
Shope, R. E., 29.  
Simmons, S. W., 24.  
Soussoko, B., 6.  
Southwell, T., & Kirshner, A., 58.  
Spray, R. S., 52.  
Springholz-Schmidt, A. J., 14.  
Stadelorth, A. W., & Scorgie, N. J., 43.  
Stamatesco. See Combiesco, D., et al., jt. authors, 2.  
Steevenson, G. F., 11.  
Steinmetzer, K., & Guder, R., 16.  
Stiles, G. W. See Davis, C. L., et al., jt. authors, 14.  
Street, H. R., 41.  
Sutherland, G. F., & Curtis, Q. F., 34.  
Sutton, T. S. See Knoop, C. E., et al., jt. authors, 37.  
Swartzwelder, J. C., 13.  
Tagliavini, A., 31.  
Tajima, Y. See Watanabe, S., et al., jt. authors, 8.  
Tajima, Y. See Itabashi, K., et al., jt. authors, 8.  
Taylor, E. L., 25.  
Taylor, J. B., 5.  
Telford, I. R., Emerson, G. A., & Evans, H. M., 41.  
Temple, P. L., & Kon, S. Z., 53.  
Thomas, A. D., & van der Wath, J. G., 36.  
Thomson, J. K. See Eccles, A., et al., jt. authors, 16.  
Tobey, J. A., 42.  
Townson, W. K., & Gordon, R. F., 48.  
Tréfouel, J., 42.  
Tremkó, F., 46.  
Tschesche, R. See Wolf, H. J., jt. author, 39.  
Tuncman, Z. M., 18.  
Turpeinen, O., 39.  
Uehlinger. See Jadassohn, et al., jt. authors, 51.  
Underwood, P. C. See Harwood, P. D., et al., jt. authors, 45.  
Urban, A., & Dechambre, E., 4.  
Vaismann, A. See Levaditi, C., et al., jt. authors, 44.  
Vallee, H., 5.  
Velu, H., 33.  
Vet. Rec., 16.  
Voss, K., 51.  
Wahlmeyer, A. See Arenas Martorell, R., et al., jt. authors, 25.  
Waldmann, 17.  
Waldmann, O., & Kölbe, K., 17.  
Washburn, R. G. See Knoop, C. E., et al., jt. authors, 37.  
Watanabe, S., Tajima, Y., Ito, S., Itabashi, K., & Yoda, H., 8.  
— See also Itabashi, K., et al., jt. authors, 8.  
van der Wath, J. G. See Thomas, A. D., jt. author, 36.  
Watkins, C. V., 30.  
Watson, S. J. See Ferguson, W. S., et al., jt. authors, 38.  
Weischer, F. See Schaper, W., jt. author, 31.  
Welch, F. V. See Barnard, J. E., jt. author, 52.  
Whalley, M. E., 36.  
Wiendieck, 55.  
Wilson, H. F., & Holmes, C. E., 48.  
Wohlfel, T., & Becker, H., 6.  
Wolf, H. J., & Tschesche, R., 39.  
Wright, W. H., 45.  
Yakimoff, W. L., 15.  
Yoda, H. See Watanabe, S., et al., jt. authors, 8.  
Ziegler, M., 3.  
Zorn, W., 49.

IMPERIAL BUREAU OF ANIMAL HEALTH

## BOVINE MASTITIS

*Survey of the Literature to the  
end of 1935*

*by*

E. MUNCH-PETERSEN, M.Sc., B.A.

F. D. McMaster, Animal Health Laboratory  
Division of Animal Health  
University of Sydney  
Australia

WEYBRIDGE, SURREY

ENGLAND

1938

*Price 10s. 0d.*

IMPERIAL BUREAU OF ANIMAL HEALTH  
New Haw, Weybridge, Surrey, England

*Please send me* <sup>\*Copy</sup> *of "Bovine Mastitis" for which I enclose* <sup>\*Cheque</sup> <sub>~~Money Order~~</sub> *for*  
<sub>Copies</sub> <sub>Postal Order</sub>

*Name*

*Address*

\*Please strike out words not applicable.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI ... ..	59-77	DISEASES, GENERAL :	
Mastitis ... ..	59	[General diseases not dealt	
Streptococci ... ..	61	with under other head-	
Anthrax ... ..	63	ings: Organic Diseases,	
Tuberculosis ... ..	64	Miscellaneous Diseases	
Haemorrhagic septicaemia ... ..	70	and Neoplasms] ...	99-107
Salmonella infection ... ..	71	Equine osteodystrophia ...	102
Brucella infection ... ..	72	Pulmonary adenoma in sheep ...	104
Anaerobic infection ... ..	75	Tumours in domestic animals ...	106
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	78-80	NUTRITION IN RELATION TO DISEASE :	
Trypanosomiasis ... ..	78	[Articles placed in the section	
Anaplasmosis... ..	79	" Diseases, General "	
Coccidiosis ... ..	80	may also contain refer-	
DISEASES CAUSED BY VIRUSES ... ..	80-90	ences to nutritional fac-	107-110
Foot and mouth disease ... ..	82	tors] ... ..	
Rinderpest ... ..	85	PUBLIC HEALTH ... ..	110-114
Equine infectious anaemia ... ..	87	Milk hygiene ... ..	110
African horse-sickness ... ..	87	Meat hygiene ... ..	112
Rabies ... ..	88	Staphylococcal food poisoning ...	113
Various ... ..	88	THERAPEUTICS ... ..	114-117
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ... ..	90-92	POISONS AND POISONING ... ..	117
PARASITES IN RELATION TO DISEASE [HELMINTHS] ... ..	92-95	PHYSIOLOGY ... ..	118-121
Trematodes ... ..	92	TECHNIQUE AND APPARATUS ... ..	121-125
Cestodes ... ..	93	MISCELLANEOUS ... ..	125-126
Nematodes ... ..	93	REPORTS ... ..	126-128
IMMUNITY [including Allergic and Serological Diagnosis] ... ..	95-99	South Africa ... ..	126
Allergic diagnosis of brucellosis ... ..	96	Fiji ... ..	127
		Europe ... ..	128
		BOOK REVIEWS ... ..	128-130

# INDEX TO AUTHORS

- Adey, C. W. See Oxer, D. T., et al., jt. authors, 77.  
 Africa, C. M., 93.  
 Alexander, R. A., 87.  
 Almquist, H. J., 108.  
 —, & Stokstad, E. L. R., 108.  
 Ameal, D. J., 92.  
 Anderson, E. O., Case, C. H., & Udall, D. H., 69.  
 Andres, T., 123.  
 Andrews, F. See McKenzie, F. F., jt. author, 120.  
 Andrews, F. N. See Warbritton, V., et al., jt. authors, 149.  
 Ansbacher, S., 108.  
 Askew, H. O., 109.  
 —, Rigg, T., & Stanton, D. J., 109.  
 Baker, J. A., 69.  
 Baranov, N., 90.  
 Bardsen, G. W., 116.  
 Bareggi, G., 77.  
 Basile, D. See Dreux, H., jt. author, 77.  
 Bennett, S. C. J., & Evans, J. T. R., 85.  
 Bernier, V. See Warbritton, V., et al., jt. authors, 119.  
 Berthelon, & Labeyrie, 104.  
 Biagowichensky, N. N., 98.  
 Blanchard, C. K., 111.  
 Bliss, E. A., 60.  
 Boes, J. See van Goudsenhoven, C., jt. author, 100.  
 Bpl. mens. Direcc. Canad. Montevideo, 74, 90, 93.  
 Børde, R. See Pigoury, L., et al., jt. authors, 92.  
 Bourgeois, G., 110.  
 Bower, C. See Corper, H. J., et al., jt. authors, 66.  
 Bowling, C. A. See van Landingham, A. H., et al., jt. authors, 118.  
 Broadhurst, J., MacLean, M. E., Saurino, V., & Slawson, A., 88.  
 Brown, J. H., 60, 66.  
 Buck, See Genovos, jt. author, 103.  
 Bull, L. B., & Turner, A. W., 75.  
 Bull, off. internat. Epiz., 128.  
 Burke, L. A., Meigs, E. B., Sanders, G. P., & Cone, J. F., 59.  
 Cailleur, R., 78.  
 Callender, G. R., & Kelsner, R. A., 102.  
 —. See also Kelsner, R. A., jt. author, 102.  
 Carmichael, J., 64.  
 Case, G. H. See Anderson, E. O., et al., jt. authors, 69.  
 Cavanaugh, G. W., 59.  
 Chapman, G. H., Lieb, C. W., & Curcio, L. G., 63.  
 Cockroft, W. H. See Dolman, C. E., et al., jt. authors, 63.  
 Cohn, M. L. See Corper, H. J., jt. author, 66.  
 —. See also Corper, H. J., et al., jt. authors, 66.  
 Colas-Belcour, J., 91.  
 Cole, H. H., 121.  
 Coles, J. D., W. A., 89.  
 Cone, J. F. See Burke, L. A., et al., jt. authors, 59.  
 Cordier, G., & Ménager, J., 119.  
 Corner, G. W., 121.  
 Corper, H. J., & Cohn, M. L., 66.  
 —, Simpson, M. G., & Bower, C., 66.  
 D'Costa, R. S. J., 85.  
 Craufurd-Benson, H. J., 115.  
 Curcio, L. G. See Chapman, G. H., et al., jt. authors, 63.  
 Czarnetzky, E. J. See Morton, H. E., jt. author, 122.  
 Dählberg, A. C., Kucera, J. J., Henning, J. C., & Hucker, G. J., 59.  
 Daubney, R., 85.  
 Davies, T. L., 92.  
 Davis, D. J., 110.  
 Davis, H. P., & Hathaway, I. L., 116.  
 Davis, W. S. See Gilcreas, F. W., jt. author, 110.  
 Del, K. See Kasahara, S., et al., jt. authors, 89.  
 Delpy, L., 91.  
 Dodds, F. C., 119.  
 von Dohlen Tiedeman, W., & Hohl, N. J., 110.  
 Dolandilhe, M., 64.  
 Dolman, C. E., Wilson, R. J., & Cockroft, W. H., 63.  
 Douthwaite, M. See Gear, J. H. S., jt. author, 90.  
 Downham, K. D., & Venn, J. A. J., 85.  
 Dreux, H., & Basile, D., 77.  
 Dungal, N., Gislason, G., & Taylor, E. L., 101.  
 Edwards, J. T., 125.  
 Edwards, S. J., 65.  
 —. See also Wilkie, J., et al., jt. authors, 65.  
 Ellisor, L. O. See McGovran, E. R., jt. author, 115.  
 Elvehjem, C. A., Madden, R. J., Strong, F. M., & Woolley, D. W., 108.  
 —. See also Underwood, E. J., jt. author, 109.  
 Espantoso, K. See Rubino, M. C., jt. author, 88.  
 Evans, A., 60.  
 Evans, J. T. R. See Bennett, S. C. J., jt. author, 85.  
 Feldman, W. H., 66.  
 Fig, 127, 66.  
 Fälsker, 82.  
 Fogediv, F. F. See Tousseng, E., et al., jt. authors, 84.  
 Forbes, J. C., 116.  
 Fowler, A. B. See Wilkie, J., et al., jt. authors, 65.  
 Frenkel, H. S., & van Waveren, G. M., 84.  
 —. See also Tousseng, E., et al., jt. authors, 84.  
 Fuchs, A. W., 110.  
 Gear, J. H. S., & Douthwaite, M., 90.  
 Genovos, & Buck, 103.  
 Getz, H. R., 114.  
 Gilcreas, F. W., & Davis, W. S., 110.  
 Gislason, G. See Dungal, N., et al., jt. authors, 104.  
 van Goudsenhoven, C., & Boes, J., 100.  
 Gokovic, D., 71.  
 Gounevic, E. See Zdrovskii, P., et al., jt. authors, 87.  
 Gomez, A. K., & Gonzaga, A. C., 103.  
 Gonzaga, A. C. See Gomez, A. K., jt. author, 103.  
 González, L. M. See Otero, P. M., jt. author, 98.  
 Groenewald, J. W., 107.  
 von Guoth, G. A., 123.  
 Hagan, W. A., 69.  
 Hagmann, A., 103.  
 Hamano, R. See Kasahara, S., et al., jt. authors, 89.  
 Hathaway, I. L. See Davis, H. P., jt. author, 116.  
 Hawkins, W. B., & Whipple, G. H., 118.  
 Henderson, H. O. See van Landingham, A. H., et al., jt. authors, 118.  
 Henderson, J. A., 101.  
 Henning, J. C. See Dählberg, A. C., et al., jt. authors, 59.  
 Henning, M. W., 112.  
 von Henney, E., 122.  
 Hirst, G. K. See Swift, H. F., jt. author, 123.  
 Hobson, P. M. See Thomas, S. B., jt. author, 110.  
 Hoffmann, P., 122.  
 Hohl, N. J. See von Dohlen Tiedeman, W., jt. author, 110.  
 Hole, N. H., 103.  
 Hucker, G. J., 59.  
 —. See also Dählberg, A. C., et al., jt. authors, 59.  
 Jackson, C., 106.  
 Jacotot, H., 86.  
 —, & le Roux, G., 88.  
 Jakimov, V. L., & Rastegaeva, E. F., 115.  
 Jastrzebski, D. See Zenker, J., et al., jt. authors, 87.  
 Jauffret, R., 70.  
 Kalmykov, E. S., 90.  
 Kasahara, S., Del, K., Uyeda, M., Okamoto, Y., Hamano, R., Yamada, R., & Tsubaki, S., 89.  
 Kelsner, R. A., & Callender, G. R., 102.  
 —. See also Callender, G. R., jt. author, 102.  
 Kemp, A. E. See Pullinger, E. J., jt. author, 112.  
 Kemper, H. E., 95.  
 Kennedy, M. See Oxer, D. T., et al., jt. authors, 77.  
 Kerr, K. B., 93, 65.  
 Kestner, O., 99.  
 Kisileff, A., 89.  
 Kolodziejska, H. See Zenkner, J., et al., jt. authors, 87.  
 Kotlan, A. See Manninger, R., jt. author, 99.  
 Kotljatova, H. See Striter, V., et al., jt. authors, 73.  
 Kraft, E., 116.  
 Kucera, J. J. See Dählberg, A. C., et al., jt. authors, 59.  
 Labeyrie See Berthelon, jt. author, 104.  
 Lancet, 114, 125.  
 van Landingham, A. H., Henderson, H. O., & Bowling, G. A., 118.  
 Landstener, K., & Pirie, N. W., 99.  
 Lavrovsky, N. F., 84.  
 Lawrence, W. A., 112.  
 Leclainche, E., 82, 128, 65.  
 Legg, J., 115.  
 Levaditi, C., & Reimé, L., 114.  
 —, & Vaisman, A., 114.  
 Lieb, C. W. See Chapman, G. H., et al., jt. authors, 63.  
 Lieke, P., 94.  
 des Ligniers, M., 105.  
 Little, R. B., 59.  
 Lwoff, M., 78.  
 Maas, 83.  
 McCulloch, E. C. See Prouty, C. C., jt. author, 60.  
 McFadyen, J., 104.  
 McGovran, E. R., 115.  
 —, & Ellisor, L. O., 115.  
 Macgregor, A. S. M., 111.  
 Maches, M., 65.  
 McKenzie, F. F., & Andrews, F., 120.  
 —. See also Warbritton, V., et al., jt. authors, 119.  
 McKinnis, W. R., 125.  
 MacLean, M. E. See Broadhurst, J., et al., jt. authors, 88.  
 MacLeod, J., 91.  
 McNaught, K. J., 109.  
 —. See also Melrose, G. B., jt. author, 109.  
 —. See also Taylor, C. R., jt. author, 109.  
 Madden, R. J. See Elvehjem, C. A., et al., jt. authors, 108.  
 Manninger, R., & Kotlan, A., 99.  
 Marzewski, 109.  
 Markov, A. A., 78.  
 Meigs, E. B. See Burke, L. A., et al., jt. authors, 59.  
 Mellanby, E., 108.  
 Melrose, G. B., & McNaught, K. J., 109.  
 Ménager, J. See Cordier, G., jt. author, 119.  
 Minett, F. C., 113.  
 Mitchell, W. M., 102.

## Index

- Mlinac, F., 71.  
 Mönning, H. O., 128.  
 Morel, C. See Placidi, L., *jt.* author, 64.  
 Morton, H. E. & Czarnetzky, E. J., 122.  
 Mrowka, F., 87.  
 Neitz, W. O., 88.  
 Nemeh, E. See Pigoury, L., *et al.*, *jt.* authors, 92.  
 Newsom, I. E., 105.  
 Okamoto, Y. See Kasahara, S., *et al.*, *jt.* authors, 89.  
 Onderstepoort Library Index, 1937, 130.  
 Oppermann, T., 129.  
 Ortlepp, R. J., 94, 95.  
 Otero, P. M., & Gonzalez, L. M., 98.  
 Ozer, D. T., Adey, C. W., & Kennedy, M., 77.  
 Pellegrini, D., 78.  
 Pentimalli, F., 89.  
 Peric, 120.  
 Pigoury, L., 114.  
 —, Burde, R., & Nemeh, E., 92.  
 Pinder, G. D., 85.  
 Pirie, N. W. See Landsteiner, K., *jt.* author, 99.  
 Placidi, L., & Morel, C., 64.  
 Pruger, R., 76.  
 Prouty, C. C., & McCulloch, E. C., 60.  
 Pullinger, F. J., & Kemp, A. E., 112.  
 Rasch, K., 121.  
 Rastegaeva, E. F. See Jakimov, V. L., *jt.* author, 115.  
 Rastegier, E. F. See Rastegaeva, E. F.  
 Rautmann, H., 65.  
 Reim, L. See Levaditi, C., *jt.* author, 114.  
 Rhodes, A. J. See van Rooyen, C. E., *jt.* author, 89.  
 —, T. See Askew, H. O., *et al.*, *jt.* authors, 109.  
 Rimington, C., & Roets, G. C. S., 117.  
 Riser, W. A., 101.  
 Roberts, R. S., 75.  
 Roets, G. C. S. See Rimington, C., *jt.* author, 117.  
 Roman, G., 75.  
 van Rooyen, C. E., & Rhodes, A. J., 89.  
 le Roux, G. See Jacotot, H., *jt.* author, 88.  
 Rubino, M. C., & Espantoso, K., 88.  
 Sacharow, B., 123.  
 Sanders, G. P. See Burkey, L. A., *et al.*, *jt.* authors, 59.  
 Sartoris, P., 121.  
 Saurino, V. See Broadhurst, J., *et al.*, *jt.* authors, 88.  
 Savage, W., 111.  
 Schaefer, W., 64.  
 Schilling, C., 129.  
 Schürmester, E., 105.  
 Schütz, F., 121.  
 Schwartz, B., 94.  
 Schwarzmaier, E., 123.  
 Seddon, H. R., 117.  
 Sherman, J. M., 61.  
 Simonnet, H., 120.  
 Simpson, M. G. See Corper, H. J., *et al.*, *jt.* authors, 66.  
 Slancetz, L. W., 111.  
 Slawson, A. See Broadhurst, J., *et al.*, *jt.* authors, 88.  
 Smith, W. K., 107.  
 South Africa, Union of, 126.  
 Spanu, P., 105.  
 Srivastava, H. D., 92.  
 Stanton, D. J. See Askew, H. O., *et al.*, *jt.* authors, 109.  
 Stazzi, P., 85.  
 Steck, W., 87.  
 Sterne, M., 63.  
 Steyn, D. G., 117, *his*.  
 Stokstad, E. L. R. See Almquist, H. J., *jt.* author, 108.  
 Striter, V., Voskresenski, B., & Kotjarova, H., 73.  
 Strodthoff, 83.  
 Strong, F. M. See Elvehjem, C. A., *et al.*, *jt.* authors, 108.  
 Strong, L. C., 116.  
 —, & Whitney, L. F., 116.  
 Stuchbery, H. M., 127.  
 Svedberg, T., 124.  
 Swift, H. F., & Hirst, G. K., 123.  
 Takahashi, Y., 64.  
 Tarasov, I., 74.  
 —, & Versilova, P., 74.  
 Taylor, C. R., & McNaught, K. J., 109.  
 Taylor, E. L., 104.  
 —, See also Dungai, N., *et al.*, *jt.* authors, 104.  
 Thomas, S. B., & Hobson, P. M., 110.  
 du Toit, P. J., 126.  
 Tousseng, E., Fogedby, E. F., Frenkel, H. S., & van Waveren, G., 84.  
 Tsubaki, S. See Kasahara, S., *et al.*, *jt.* authors, 89.  
 Turbet, C. R., 101, 127.  
 Turner, A. W. See Bull, L. B., *jt.* author, 75.  
 Udall, D. H. See Anderson, E. O., *et al.*, *jt.* authors, 59.  
 Underwood, E. J., & Elvehjem, C. A., 109.  
 Uyeda, M. See Kasahara, S., *et al.*, *jt.* authors, 89.  
 Vaisman, A. See Levaditi, C., *jt.* author, 114.  
 Venn, J. A. J. See Downham, K. D., *jt.* author, 95.  
 Venzke, W. G., 120.  
 Versilova, P. See Tarasov, I., *jt.* author, 74.  
 Vianello, G., 69.  
 Voskresenski, B. See Striter, V., *et al.*, *jt.* authors, 73.  
 —, See also Zdrovovskii, P., *et al.*, *jt.* authors, 97.  
 Wagener, K., 99.  
 Wanner, A., 71.  
 Warbritton, V., McKenzie, F. F., Berliner, V., & Andrews, F. N., 119.  
 van Waveren, G. See Fienkel, H. S., *jt.* author, 84.  
 —, See also Tousseng, E., *et al.*, *jt.* authors, 84.  
 Webster, L. T., 88.  
 Whipple, G. H. See Hawkins, W. B., *jt.* author, 118.  
 Whitney, L. F. See Strong, L. C., *jt.* author, 116.  
 Wilkie, J. Edwards, S. J., Fowler, A. B., & Wright, N. C., 65.  
 Wilson, R. J. See Dolman, C. E., *et al.*, *jt.* authors, 63.  
 Woolley, D. W. See Elvehjem, C. A., *et al.*, *jt.* authors, 108.  
 Wright, N. C. See Wilkie, J., *et al.*, *jt.* authors, 65.  
 Yakimoff, W. L. See Jakimov, V. L.  
 Yamada, R. See Kasahara, S., *et al.*, *jt.* authors, 89.  
 Yutuc, L. M., 78.  
 Zdrovovskii, P., 72, *his*, 96, 97.  
 —, Voskresenski, B., & Golmevic, E., 97.  
 Zeitin, R., 113.  
 Zenkner, J., Kolodziejcka, H., & Jastrzebski, D., 87.

### CORRIGENDUM.

V.B. 9, 49, line 29. For 52-61 read 52-61

## INDEX VETERINARIUS.

See notice on page 4 of cover.

# BOVINE MASTITIS

by

**F. D. McMaster, Animal Health Laboratory  
Division of Animal Health  
University of Sydney  
Australia**

1939

*Price* 10s. 0d.

Please send me <sup>\*Copy</sup> Copies of "Bovine Mastitis" for which I enclose <sup>\*Cheque</sup> Money Order <sup>for</sup> Postal Order

Name \_\_\_\_\_

**Address**

\*Please strike out words not applicable.

## CONTENTS

## LIST OF CHIEF SUBJECTS

Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: e.g. Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

DISEASES CAUSED BY BACTERIA AND FUNGI				PAGE	DISEASES, GENERAL :				PAGE
Mastitis	...	...	...	131-153	[General diseases not dealt with under other headings : Organic Diseases, Miscellaneous Diseases and Neoplasms]				169-175
Anthrax	...	...	...	139					
Tuberculosis	...	...	...	141					
Salmonella infection	...	...	...	146					
Brucella infection	...	...	...	147					
Anaerobic infection	...	...	...	151					
DISEASES CAUSED BY PROTOZOAN PARASITES				154-157	NUTRITION IN RELATION TO DISEASE :				
Trypanosomiasis	...	...	...	154	[Articles placed in the section "Diseases, General" may also contain references to nutritional factors]				175-178
Coccidiosis	...	...	...	155					
Leptospirosis	...	...	...	156					
DISEASES CAUSED BY VIRUSES				157-163	PUBLIC HEALTH				178-181
Foot and mouth disease	...	...	...	157					
Contagious bovine pleuro-pneumonia	...	...	...	158	THERAPEUTICS				182-184
Avian sarcoma	...	...	...	160					
Avian leucosis	...	...	...	161	POISONS AND POISONING				184-187
Avian infectious fibroma	...	...	...	162					
PARASITES IN RELATION TO DISEASE [ARTHIPODS]				168-164	PHYSIOLOGY				187-191
					TECHNIQUE AND APPARATUS				191-194
					MISCELLANEOUS				194-199
					REPORTS				199-213
					Great Britain				199
					India				202
					British Colonial Territories...				202
					United States of America				206
PARASITES IN RELATION TO DISEASE [HELMINTHS]				165-166					
					BOOK REVIEWS				213-216
IMMUNITY [including Allergic and Serological Diagnosis]				166-169					

# INDEX TO AUTHORS

- Abraham, S. See Pincus, S., et al., jt. authors, 179.
- Agricultural Research Council, 199.
- Ahlström, C. G., 162.
- Andrews, C. H., 162.
- Ahmman, C. F. See Neal, W. M., jt. author, 183.
- Albiston, H. E., 151.
- Aleksa, K., & Kazys, J., 141.
- Allen, E. See Burr, H. S., et al., jt. authors, 187.
- Allen, F. W. See Schmidt, C. I. A., jt. author, 216.
- Anderson, E. O. See Plastringe, W. N., et al., jt. authors, 133.
- See also White, G. C., et al., jt. authors, 133.
- Andersson, N., 142.
- Andreoni, R., 185.
- Andrews, C. H. See Ahlstrom, C. G., jt. author, 162.
- de Aquino, D., 169.
- de Araujo, E., 145.
- Arch. internat. Brucellosis, 147.
- Argas, P. de T., 194.
- Asheshov, I. N., 193.
- Vincourt Astor, & Rowntree, B. S., 213.
- Atkeson, F. W. See Fay, A. C., et al., jt. authors, 131.
- Azione vet., 198.
- Babcock, S. J., Jr. See Jukes, T. H., jt. author, 177.
- Bailly, J. See Remlinger, P., jt. author, 214.
- Baker, J. A., 153.
- Bareggi, G., 143.
- Bartels, 164.
- Barth, E. E. See Mills, M. A., et al., jt. authors, 143.
- Baschung, Langeron, M., & Leblais, 175.
- Basutoland, 202.
- Baudet, E. A. R. F., 166.
- Bayer, G., & Wense, T., 190.
- Beck, C. E., & Wyckoff, R. W. G., 158.
- Becker, E. R., & Willeke, H. L., 176.
- Becker, R. B., & Gaddum, L. W., 183.
- Bell, J. F. See Green, R. G., et al., jt. authors, 170.
- Bennetts, H. W., 158.
- Berninzoni, T. See Guillermo, et al., jt. authors, 148.
- Beison, P. See Laporte, A., et al., jt. authors, 151.
- Besse, 186.
- Bild, C. E., 183.
- Blum, H. F., 174.
- Blumenberg, W., 156.
- Bond, C. J., 190.
- Boquet, A., 167.
- Branion, H. D. See LeMasurier, H. E., jt. author, 177.
- Breed, R. S., 137, 180.
- Brink, R. A. See Smith, W. A., jt. author, 186.
- Brit. med. J., 198.
- Britton, J. W., 165.
- Brumot, E., 155.
- Bull, L. E., & Dickinson, C. G., 161.
- Burkey, L. A., Sanders, G. P., & Cone, J. F., 131.
- Burnet, F. M., & Freeman, Mavis, 163.
- Burr, H. S., Hull, R. T., & Allen, E., 187.
- Campbell, A. D. See Turner, A. W., jt. author, 158.
- Capodaglio, A., 178.
- Carmichael, J., 204.
- Carpano, M., 165.
- Cave, H. W. See Fay, A. C., et al., jt. authors, 131.
- Chow, C. Y. See Hsu, H. F., jt. author, 165.
- Christensen, J. F., 155.
- Clark, H. C., 173.
- Clark, C. H. D., 164.
- Cone, J. F. See Burkey, L. A., et al., jt. authors, 131.
- Cottier, H., 199.
- Crum, J. D. See Nolf, L. O., jt. author, 166.
- Davis, J. See Reboul, J., et al., jt. authors, 187.
- Davis, W. S. See Gilcreas, F. W., jt. author, 179.
- Deem, A. W. See Thorp, F., Jr., et al., jt. authors, 186.
- Dehmel, H. See Wolters, K. L., jt. author, 152.
- Derrick, E. H., 163.
- Dickinson, C. G. See Bull, L. B., jt. author, 161.
- Dildine, S. C., 184.
- Dinsmore, W., 173.
- Dobson, N., 159.
- Dodds, E. C., Lawson, W., & Noble, R. L., 189.
- van Dorsen, C. A., 146.
- Dzunkowski, E., 156.
- Ecker, E. E., & Pillemmer, L., 193.
- Elliott, S. D., 191.
- Engelhardt, H., 174.
- Erdős, L., 172.
- Ernst, J. See Henningsen, E. J., jt. author, 180.
- Ernst, W., 175.
- Evans, C. A. See Green, R. G., et al., jt. authors, 170.
- Faulhaber, L. J. See Moore, W., et al., jt. authors, 147.
- Fay, A. C., Cave, H. W., & Atkeson, F. W., 131.
- Ferguson, Jean, 137.
- Foley, H., 191.
- Folley, S. J., & Watson, Helen, 189.
- Foot, A. S., & Shattock, P. M. F., 135.
- , & Thomson, A. Y., 176.
- Fraenkel, E. M., & Mawson, C. A., 160, bis.
- Freeman, Mavis. See Burnet, F. M., jt. author, 163.
- French, M. H., 154.
- Frenkel, H. S., 157.
- Friedgood, H. B. See Reboul, J., et al., jt. authors, 187.
- Gábor, G., 173.
- Gábor, O. See Kanyó, B., jt. author, 158.
- Gaddum, L. W. See Becker, R. B., jt. author, 183.
- Gard, S., 146.
- Genet, C., 152.
- Gettkandt, A., 189.
- Geurden, L. M. G., & Willems, A. F. R., 153.
- Gianfranceschi, G., 143.
- Gibbons, W. J., 137.
- Gilcreas, F. W., & Davis, W. S., 179.
- Godfrey, E. S., Jr., 179.
- Gold Coast Colony, 203.
- Goodpasture, E. W., 192.
- Goyal, R. K., 153.
- Gräub, E., 147.
- Gray, J. D. A. See Stone, Doris M., jt. author, 189.
- Great Britain, 194, 199, 201.
- , Report on Agricultural Research, 214.
- Green, R. G., Bell, J. F., Evans, C. A., & Mather, D. W., 170.
- Griennella, C. D. See Moore, W., et al., jt. authors, 147.
- Guillermo, Lockart, P., & Berninzoni, T., 148.
- Gunn, F. D. See Mills, M. A., et al., jt. authors, 143.
- Guth, G. E., 172.
- Hadley, F. B., 131.
- Haerid, O., 172.
- Lord Hailey, 198.
- Haines, R. B., 181.
- Hall, Kathleen, & Korenchevsky, V., 188.
- Hamburger, C., 190.
- Harrington, H. D. See Thorp, F., Jr., et al., jt. authors, 186.
- Hart, L., 146.
- Harwood, P. D., & Jerstead, A. C., 182.
- Hazemann, R. H. See Taylor, R. M., et al., jt. authors, 149, 151.
- Hegyesi, Z., 140.
- Henderson, G. T., 202.
- Henningsen, E. J., & Ernst, J., 180.
- Henry, M., 139.
- Herrick, C. A. See Holmes, C. E., et al., jt. authors, 155.
- Hill, R. T. See Burr, H. S., et al., jt. authors, 187.
- Himmelsweit, F., 192.
- Holmes, C. E., Herrick, C. A., & Ott, G. L., 155.
- Holmes, F., 182.
- Holmes, M. J., 144.
- Holz, 171.
- Hong Kong, 205.
- Hosek, A., 160.
- Hsu, H. F., & Chow, C. Y., 165.
- Hucker, G. J., 137.
- , & Marquardt, J. G., 181.
- Hull, F. E. See Morrison, H. B., jt. author, 148.
- Hunter, J. E. See Murphy, R. R., et al., jt. authors, 176.
- Hupbaut, A., 168, 171.
- India, 202.
- Insko, W. M., Jr., Lyons, M., & Martin, J. H., 177.
- Iyengar, K. R. K., 202.
- Jerstad, A. C. See Harwood, P. D., jt. author, 182.
- Johnson, H. W. See Miller, W. T., jt. author, 134.
- Johnson, R. E. See White, G. C., et al., jt. authors, 133.
- Johnston, T., 135.
- Joling, K. F., 166.
- J. Dep. agric. Vict., 171.
- Jukes, T. H., & Babcock, S. J., Jr., 177.
- Kanyó, B., & Gabor, O., 158.
- Kaura, R. L., 169.
- Kawai, T., 183.
- Kay, H. D., 201.
- Kazys, J. See Aleksa, K., jt. author, 141.
- Keiz, 144.
- Kingston, G. S., 171.
- Kleckner, A. L. See Klein, L. A., et al., jt. authors, 187.
- Klein, L. A., Kleckner, A. L., & Scheidy, S. F., 137.
- Knandel, H. C. See Murphy, R. R., et al., jt. authors, 176.
- Kollonay, E., 172.
- Kon, S. K., 199.
- Kopciowska, L. See Nicolau, S., jt. author, 189.
- Korenchevsky, V. See Hall, Kathleen, 188.
- Kotharova, H. See Striter, V., jt. author, 7.
- See also Tarasov, I., jt. author, 149.
- Krantz, G. T., 142.
- Kreis, B., 163.
- Kujumgieff, I., 140.
- Kustallow, 189.
- Lamborn, W. A., 204.
- Lancet, 199.
- Lange, B., 144.
- Langeron, M. See Baschung, et al., jt. authors, 175.

# Index

- Laporte, A., Berson, P., & Margout, G., 151.  
 Larson, A. H. See Rogers, C. F., et al., jt authors, 186.  
 Laszlo, H., 159.  
 Lawson, W. See Dodds, E. C., et al., jt authors, 189.  
 Leblous. See Baschung, et al., jt authors, 175.  
 Ledingham, J. C. G., 161.  
 Lehmkuhl, H. W., 181.  
 LeMasurier, H. E., & Branson, H. D., 177.  
 Ligeti, M., 145.  
 Lins, A. E. E., 193.  
 Lisbonne, M. See Taylor, R. M., et al., jt authors, 149, 151.  
 Little, R. B., 131.  
 Lloyd, D. J., 169.  
 Lockart, P. See Guillermo, et al., jt authors, 148.  
 Lyons, M. See Insko, W. M., Jr., et al., jt authors, 177.  
 McCullough, N. B., 178.  
 MacDonald, Ruth. See Wilkon, I. D., jt author, 156.  
 MacHattie, C., 157.  
 Mackay, J. M., 203.  
 McKennedy, F. D., & Shillinger, J. E., 145.  
 Mackenzie, W. J. E., 205.  
 Marcovitch, S., Shuey, G. A., & Stanley, W. W., 184.  
 Margout, G. See Laporte, A., et al., jt authors, 151.  
 Marquardt, J. G. See Hucker, G. J., jt author, 181.  
 Martin, J. H. See Insko, W. M., et al., jt authors, 177.  
 Martin, W. E., 147.  
 Mather, D. W. See Green, R. G., et al., jt authors, 170.  
 Mathews, F. P., 185.  
 Mawson, C. A. See Fraenkel, E. M., jt author, 160, *bs*.  
 Mensters, N., 175.  
 Mery, F., 143.  
 Mesnil, F., Pérard, C., & Provost, A., 151.  
 Mewson, I. B., & Thorp, F. J., 151.  
 Meyer, K., & Pic, A., 165.  
 Meza, J., 203.  
 Mezaka, P., 139.  
 Michaelis, 164.  
 Miescher, K., Scholz, C., & Tschopp, F., 187.  
 Muller, R. W. R., 205.  
 Miller, W. T., 137.  
 —, & Johnson, H. W., 134.  
 Mills, M. A., Gunn, F. D., & Barth, E. E., 143.  
 Mirimanoff, A., 178.  
 Mlinac, F., & Oswald, B., 163.  
 Mohler, J. R., 206, 208, 210.  
 Moore, W., Grinnells, C. D., & Faulhaber, L. J., 147.  
 Morgulis, S., & Osheroff, W., 177.  
 Morrill, C. C., 137.  
 Morrison, H. B., & Hull, F. E., 148.  
 Müller, A., 191.  
 Mulhearn, C. R., 171, *bs*.  
 Murphy, R. R., Hunter, J. E., & Kandel, H. C., 176.  
 Natvig, L. R., 163.  
 Neal, W. M., & Ahmann, C. F., 183.  
 Negri, R., 190.  
 Neveu, R., 180.  
 Nicolau, S., & Kopcowska, L., 189.  
 Niimi, D., 166.  
 Noble, R. L. See Dodds, E. C., et al., jt authors, 189.  
 Nolf, L. O., 160.  
 —, & Crum, J. D., 166.  
 Nothdorff, G. See Rittner, H., jt author, 141.  
 Nyasaland Protectorate, 203, 204.  
 Nyfeldt, A., 101.  
 Ocampo, J. A. See Wille, J., et al., jt authors, 182.  
 Pesterlin, M., 215.  
 Oesterreich, E., 144.  
 Orlov, E. S., 148.  
 Osheroff, W. See Morgulis, S., jt author, 177.  
 von Ostertag, R., 181.  
 Oswald, B. See Mlinac, F., jt author, 163.  
 Ott, G. L. See Holmes, C. E., et al., jt authors, 155.  
 Papp, G., 172.  
 Pentimalli, F., & Schmidt, G., 160.  
 Perard, C. See Mesnil, F., et al., jt authors, 154.  
 Petragiani, G., 144.  
 Pharmaceutical Pocket Book, 216.  
 Pic, A. See Meyer, K., jt author, 168.  
 Pillemer, L. See Ecker, E. E., jt author, 193.  
 Pincus, S., Abraham, S., & Tiedeman, W. D., 179.  
 Pinteaux, M., 189.  
 Prosky, I., 168.  
 Plastridge, W. N., Anderson, E. O., & Seremet, J. S., 133.  
 — See also White, G. C., et al., jt authors, 133.  
 Plum, N., 166.  
 Pohl, G., 168.  
 Poncet, A., 156.  
 Ponsford, Phyllis A. See Stewart, W. L., jt author, 159.  
 Pool, W. A., 159.  
 Poulton, W. F., 204.  
 Proscholdt, 141.  
 Provost, A. See Mesnil, F., et al., jt authors, 154.  
 Pschorr, 157.  
 Pullinger, E. J., 168.  
 Rabaghuti, D. S., 178.  
 Ramsdell, G. A., 179.  
 Rankins, A., 206.  
 Ratcliffe, H. See Stubbs, E. L., jt author, 173.  
 Raynor, R. N., 187.  
 Reboul, J., Friedgood, H. B., & Davis, J., 187.  
 Remlinger, P., & Bailly, J., 214.  
 Rice, J. I., 178.  
 Rittner, H., & Nothdorff, G., 141.  
 Rogers, C. F., Larson, A. H., & Spracher, M. L., 186.  
 Rolle, M., 141.  
 Roots, E., 147.  
 Rosati, T., 149, 152.  
 Rowland, S. J., & Zenn-el-Dine, M., 135, *bs*.  
 Rowntree, B. S. See Viscount Astor, jt author, 213.  
 Rudessil, C. L., 145.  
 Rush, W. See Shillinger, J. E., jt author, 170.  
 Russell, C., 167.  
 Sabn, A. B., 156.  
 van Saeghem, R., 154.  
 Sanders, G. P. See Burkey, L. A., et al., jt authors, 131.  
 Sarnowicz, W., 145.  
 Scherdy, S. F. See Klein, L. A., et al., jt authors, 137.  
 Schlotthauer, C. F., 173.  
 Schmidt, C. L. A., & Allen, F. W., 216.  
 Schmidt, G. See Pentimalli, F., jt author, 160.  
 Schofield, D. See Wille, J., et al., jt authors, 182.  
 Scholz, C. See Miescher, K., et al., jt authors, 187.  
 Schürmann, E., 142.  
 Sedlmeier, H., 172.  
 Seifried, O., 160.  
 Seremet, J. S. See Plastridge, W. N., et al., jt authors, 133.  
 Sforza, M., 140.  
 Shattock, P. M. F. See Foot, A. S., jt author, 135.  
 Sherman, J. M., 136.  
 Shillinger, J. E., & Rush, W., 170.  
 — See also McKennedy, F. D., jt author, 145.  
 Shuey, G. A. See Marcovitch, S., et al., jt authors, 184.  
 Smith, W. A., & Brink, R. A., 186.  
 Spracher, M. L. See Rogers, C. F., et al., jt authors, 186.  
 Sprinholz-Schmidt, A. J., 154.  
 Stanley, W. W. See Marcovitch, S., et al., jt authors, 184.  
 Stewart, W. L., & Ponsford, Phyllis A., 159.  
 Stone, Doris M., & Gray, J. D. A., 139.  
 Sturdy, R., 169.  
 Strrier, V., & Kotjarova, H., 167.  
 Stubbs, E. L., & Ratcliffe, H., 173.  
 Stubenrauch, L., 152.  
 Tarasov, I., & Kotjarova, H., 149.  
 — See also Versilova, P., jt author, 150.  
 Taylor, R. M., Lisbonne, M., Vidal, L. F., & Hazemann, R. H., 149, 151.  
 Thompson, R. L., 162.  
 Thomson, A. Y. See Foot, A. S., jt author, 176.  
 Thorp, F. J., Jr., Deem, A. W., Harrington, H. D., & Tobiska, J. W., 186.  
 — See also Mewson, I. E., jt author, 151.  
 Tiedeman, W. D. See Pincus, S., et al., jt authors, 179.  
 Tobiska, J. W. See Thorp, F. J., Jr., et al., jt authors, 186.  
 Toumanoff, C., 155.  
 Trans High agric Soc Scot., 202.  
 Trembl, F., 141.  
 Trinidad and Tobago, 206.  
 Tschopp, E. See Miescher, K., et al., jt authors, 187.  
 Tucker, F. C., 169.  
 Tully, W. C., 176.  
 Tunnich, E. A., 153.  
 Turner, A. W., & Campbell, A. D., 158.  
 Uganda Protectorate, 204, *bs*.  
 United States of America, 206, 208, 210, 213.  
 —, Ann Rep agric Exp Sta., 212.  
 Urbányi, L., 176.  
 — See also Wellman, O., jt author, 176.  
 Versilova, P., & Tarasov, I., 150.  
 Vidal, L. F. See Taylor, R. M., et al., jt authors, 149, 151.  
 Villani, S., 146.  
 Watson, Helen. See Folley, S. J., jt author, 189.  
 Weberbauer, A. See Wille, J., et al., jt authors, 182.  
 Webster, L. T., 162.  
 Wenneck, E., 191.  
 Weirther, F. J. See White, G. C., et al., jt authors, 133.  
 Wellman, O., & Urbányi, L., 176.  
 Wense, T. See Bayer, G., jt author, 190.  
 White, C., 144.  
 White, G. C., Anderson, E. O., Johnson, R. E., Plastridge, W. N., & Weirther, F. J., 133.  
 Wilcke, H. L. See Becker, E. R., jt author, 176.  
 Wille, J., Ocampo, J. A., Weberbauer, A., & Schofield, D., 182.  
 Willems, A. E. R. See Geurden, L. M. G., jt author, 153.  
 Wilson, I. D., & MacDonald, Ruth, 156.  
 Wilson, P. W., 170.  
 Wirth, D., & Zwick, W., 215.  
 Wolters, K. I., & Dehmel, H., 152.  
 Worthington, E. B., 198.  
 Wyckoff, R. W. G. See Beck, C. E., jt author, 158.  
 Zanzibar Protectorate, 205.  
 Zenn-el-Dine, M. See Rowland, S. J., jt author, 135, *bs*.  
 Zwick, W. See Wirth, D., jt author, 215.

## INDEX VETERINARIUS.

See notice on page 4 of cover.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

#### **Books for Review.**

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

#### **Reprint Collection.**

The Bureau now has a very extensive collection of reprints dating from about 1930. These are kept in safe custody and are available for reference by those visiting the Bureau.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI ... ..	217-233	NUTRITION IN RELATION TO DISEASE :	
Mastitis ... ..	217	[Articles placed in the section	
Anthrax ... ..	218	“ Diseases, General ”	
Tuberculosis ... ..	220	may also contain refer-	
Brucella infection ... ..	223	ences to nutritional fac-	
Anaerobic infection ... ..	230	tors] ... ..	266-270
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	233-237	Ricketts ... ..	266
Trypanosomiasis ... ..	233	Mineral deficiency ... ..	267
Leishmaniasis ... ..	235	Vitamin deficiency ... ..	269
Piroplasmosis ... ..	236	PUBLIC HEALTH ... ..	270-273
Leptospirosis ... ..	237	THERAPEUTICS ... ..	273-275
DISEASES CAUSED BY VIRUSES ... ..	238-246	POISONS AND POISONING ... ..	275-276
Foot and mouth disease ... ..	238	PHYSIOLOGY ... ..	276-278
Equine infectious anaemia ... ..	239	TECHNIQUE AND APPARATUS ... ..	278-279
Equine encephalomyelitis ... ..	240	MISCELLANEOUS ... ..	279
Rabies ... ..	242	REPORTS ... ..	280-283
Various ... ..	244	Northern Ireland ... ..	280
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ... ..	246-248	Southern Rhodesia ... ..	280
PARASITES IN RELATION TO DISEASE [HELMINTHS] ... ..	248-251	Trinidad and Tobago ... ..	280
IMMUNITY [including Allergic and Serological Diagnosis] ... ..	251-255	Denmark ... ..	281
Serological diagnosis of brucellosis ... ..	252	Holland ... ..	281
DISEASES, GENERAL :		Dutch East Indies ... ..	282
[General diseases not dealt with under other headings : Organic Diseases, Miscellaneous Diseases and Neoplasms] ... ..	255-266	Italy ... ..	282
Porphyria ... ..	256	BOOK REVIEWS ... ..	283-284
Experimental pneumonia ... ..	258		
Inherited defects ... ..	263		

# INDEX TO AUTHORS

- dt Aichelburg, U., 230  
 Ajello, P., 245.  
 Alekss, K., 228.  
 Anderson, J. See Daubney, R., et al., jt. authors, 263.  
 Balozet, L., 242.  
 Bardelli, P., 282.  
 Barrett, W. L., Jr., 247.  
 Bartel, H., 271.  
 Beauvillain, 254.  
 Beller, K., & Zunker, M., 256.  
 Bendixen, H. C., 278.  
 Bernard, M. See Pigoury, L., et al., jt. authors, 240.  
 Bernkopf, H., & Kligler, I. J., 242.  
 Bertoni, G., 242.  
 Bettini, U., 225.  
 Bevan, L. E. W., 278.  
 Beveridge, W. T. B., 260.  
 Bieberdorf, G. A. See Fenton, F. A., jt. author, 247.  
 Birch, T. W., Chick, Harriette, & Martin, C. J., 269.  
 Bisschop, J. H. R. See Mason, J. H., et al., jt. authors, 230.  
 Bisset, K. A., 254.  
 Bovin, A., & Mesrobian, L., 252.  
 — See also Ramon, G., et al., jt. authors, 254.  
 Bol Soc brasil. Med vet., 279.  
 Boide, R. See Pigoury, L., et al., jt. authors, 240.  
 Borgstrom, Floreine A., 248.  
 Bosworth, T. J. See Montgomerie, R. F., et al., jt. authors, 260.  
 Bull Serv zootech Epiz A O F., 233.  
 Buttle, G. A. H., & Parish, H. J., 274.  
 Cameron, Hazel C. See Dodds, G. S., jt. author, 266, bis.  
 Canard, 250.  
 Cannon, P. R. See Walsh, T. E., jt. author, 253.  
 Carstens, P., Wenzler, G., & Durr, M., 265.  
 Cawston, F. G., 250.  
 Chelle, P. L. See Cuillé, J., jt. author, 262.  
 Chick, Harriette, Macrae, T. F., Martin, A. J. P., & Martin, C. J., 269, 270.  
 — See also Birch, T. W., et al., jt. authors, 269.  
 Clark, H. C., 279.  
 Clark, R., 218.  
 Coggeshall, L. T. See Robertson, O. H., et al., jt. authors, 258.  
 — See also Terrell, E. E., et al., jt. authors, 258.  
 Coles, J. D. W. A., 236.  
 Coniver, L. See Deleau, N. T., et al., jt. authors, 284.  
 Cornacchia, G., 255.  
 Corson, J. F., 234, ter.  
 Cotrufo, P., 227.  
 Crampon, P. See Lagrand, P., et al., jt. authors, 229.  
 Cuillé, J., & Chelle, P. L., 262.  
 Curson, H. H. See Malan, A. I., et al., jt. authors, 277.  
 — See also Malan, A. P., jt. author, 277.  
 Das, G. C. See Ray, N. N., jt. author, 254.  
 Daubney, R., Hudson, J. R., & Anderson, J., 263.  
 Debonera, G., 234.  
 Dedé, K. See Miesner, H., jt. author, 237.  
 Deleau, N. T., Fabre, R., & Coniver, L., 284.  
 Denmark, 281.  
 Deobald, H. J. See Holmes, C. E., et al., jt. authors, 266.  
 Dessy, G., 220.  
 Deuel, H. J., Jr., Hallman, L. F., & Murray, Sheila, 270.  
 Dtsch. tierärztl. Wschr., 238.  
 Dimulesco, G., & Vesileco, C., 246.  
 Djaenedin, R. See Kraneveld, F. C., jt. author, 274.  
 Djounchitch, M. See Ramon, G., et al., jt. authors, 254.  
 Dodds, G. S., & Cameron, Hazel C., 266, bis.  
 Dold, H., 255.  
 Donatien, A., & Lestoquard, F., 235, bis, 241.  
 — See also Lestoquard, F., jt. author, 235.  
 Dürr, M. See Carstens, P., et al., jt. authors, 265.  
 Dutch East Indies, Java, 282.  
 Eaton, O. N., 263.  
 Eisenbrandt, L. L., 249.  
 Ernst, J. See Henningsen, E. J., jt. author, 270.  
 Fabre, R. See Deleau, N. T., et al., jt. authors, 284.  
 Fairbrother, R. W., & Martin, A. E., 245.  
 Faure, L., 260.  
 Fenton, F. A., & Bieberdorf, G. A., 247.  
 Ferguson, L. C. See Irwin, M. R., jt. author, 252.  
 Fischer, G., 239.  
 Fohrman, M. H. See Miller, F. W., et al., jt. authors, 223.  
 Fourie, P. J., & Rimington, C., 256.  
 Fourie, P. J. J., 256.  
 Frauchiger, E., 244.  
 —, & Hofmann, W., 244.  
 Frei, W., 238.  
 Furlong, J. R., 279.  
 Galloway, I. A., 244.  
 Gardinazzi, L., 224.  
 Gernez, C. See Legrand, R., et al., jt. authors, 220.  
 Ghinelli, I. See Paltrimeri, S., jt. author, 225.  
 Glover, R. E. See Montgomerie, R. F., et al., jt. authors, 260.  
 Gordon, Ruth E., 219.  
 Goret, P., 251.  
 Gowen, J. W., 263.  
 Graves, R. R. See Miller, F. W., et al., jt. authors, 223.  
 Grazzini, A., 220.  
 Gregory, P. W. See Regan, W. M., et al., jt. authors, 263.  
 Grieder, H., 230.  
 Groenewald, J. W. See Malan, A. I., et al., jt. authors, 267.  
 Guélin, A. See Pozerski, E., jt. author, 282.  
 Gunn, F. D., & Nungester, W. J., 259.  
 Haber, P. See Paic, M., et al., jt. authors, 238.  
 Hadley, F. B. See Peterson, E. H., et al., jt. authors, 217.  
 Hallman, L. F. See Deuel, H. J., Jr., et al., jt. authors, 270.  
 Hansen, P., 281.  
 Harako, K. See Itabashi, K., et al., jt. authors, 224.  
 Hastings, C. C., 268.  
 Hastings, E. G. See Peterson, E. H., et al., jt. authors, 217.  
 Heidegger, E., 288.  
 Henninger, E. See Russeff, C., jt. author, 222.  
 Henningsen, E. J., & Ernst, J., 270.  
 Henard, C. See van Hoof, L., et al., jt. authors, 233.  
 Herrick, C. A. See Holmes, C. E., et al., jt. authors, 266.  
 Hertha, K., 276.  
 Himmel, 238.  
 Hirato, K., 278.  
 Hlaváček, B., 222.  
 Hofman, W. See Frauchiger, E., jt. author, 244.  
 Holmes, C. E., Deobald, H. J., & Herrick, C. A., 266.  
 van Hoof, L., Henriard, C., & Peel, E., 233.  
 Horlacher, W. R. See Wipprecht, C., jt. author, 263.  
 Horstmann, H., 221.  
 Hruška, K., 261.  
 Huber, F. L., 282.  
 Huddleson, I. F. See Munger, Myrtle, jt. author, 262.  
 Hudson, J. R. See Daubney, R., et al., jt. authors, 263.  
 Hupbauer, A., 232.  
 Ikegaya, S. See Nagahata, S., jt. author, 246.  
 Irwin, M. R., & Ferguson, L. C., 252.  
 Ishi, S. See Nakamura, N., et al., jt. authors, 239, bis.  
 Itabashi, K., Ito, S., Watanabe, S., Tajima, Y., & Harako, K., 224.  
 Italy, 282.  
 Ito, S. See Itabashi, K., et al., jt. authors, 224.  
 Jackson, C., 278.  
 Jansen, J., 232, 281.  
 Joltrain, E., 239.  
 Jonnard, R., 253.  
 J. Amer. vet. med. Ass., 242.  
 J. Hered., 263.  
 Joyeux, C., & Sautet, J., 235.  
 Joyner, A. L., & Sabin, F. R., 221.  
 Kalikm, B., 222.  
 Kau, L. S., & Wu, K., 250.  
 Kelsner, R. A., 241, bis.  
 King, H., Lourie, E. M., & Warrington Yorke, 273.  
 Klarenbeek, A., & Winser, J., 237.  
 Kligler, I. J. See Bernkopf, H., jt. author, 242.  
 Koch, W., 283.  
 Kolb, L. C. See Wintrobe, M. M., et al., jt. authors, 269.  
 Kotjarova, H., 252.  
 Kotjarova, N., & Veršilova, P., 226.  
 Kraneveld, F. C., & Djaenedin, R., 274.  
 Krassnoff, D. See Paic, M., et al., jt. authors, 238.  
 Kukla, F. W., 222.  
 Lafenêtre, H., & Roman, G., 225.  
 Lamont, H. G., 240.  
 László, F., 265.  
 Lawrence, D. A., 280.  
 Lebasque. See Monner, jt. author, 232.  
 Lefort, E. See Legrand, R., et al., jt. authors, 220.  
 Legrand, R., Gernez, C., Crampon, P., & Lefort, E., 220.  
 Lépine, P., & Sauter, V., 242.  
 Lesbouyries, G., 245.  
 Lestoquard, F., & Donatien, A., 235.  
 —. See also Donatien, A., jt. author, 235, bis, 241.  
 Letard, E., 265.  
 Lourie, E. M. See King, H., et al., jt. authors, 273.  
 Maccolini, R. See Ramon, G., et al., jt. authors, 254.  
 McCorry, P. A., 244.  
 McDearman, Sara. See Sprunt, D. H., et al., jt. authors, 277.  
 Machan, G., 270.  
 Macrae, T. F. See Chick, Harriette, et al., jt. authors, 269, 270.

# Index

- Malan, A. I., Malan, A. P., & Curson, H. H., 277.  
 —, du Toit, P. J., & Groenwald, J. W., 267.  
 — See also Theiler, A., et al., jt. authors, 267.  
 — See also du Toit, P. J., jt. author, 268.  
 — See also du Toit, P. J., et al., jt. authors, 267.  
 Malan, A. P. & Curson, H. H., 277.  
 — See also Malan, A. I., et al., jt. authors, 277.  
 Malbrant, R., 236  
 Malfroy, 233.  
 Mandelbotm, A. B., 278.  
 Manresa, M., & Reyes, N. C., 276  
 Marniović, O., 231  
 Martin, A. E. See Fairbrother, R. W., jt. author, 245.  
 Martin, A. J. P. See Chick, Harriette, et al., jt. authors, 269, 270.  
 Martin, C. J. See Birch, T. W., et al., jt. authors, 269.  
 — See also Chick, Harriette, et al., jt. authors, 269, 270.  
 Mason, J. H., 231  
 —, Steyn, H. P., & Bisschop, J. H. R., 230  
 — See also Sterne, M., jt. author, 231.  
 Mastrofrancisco, N. See Mello, A., jt. author, 273.  
 Matveev, S., 228.  
 —, S. W. See Regan, W. M., et al., jt. authors, 263  
 Mello, A., & Mastrofrancisco, N., 273.  
 Mesrobian, I. See Bovin, A., jt. author, 252.  
 Metvier, H. V. M., 280  
 Miesner, H., & Dedie, K., 237.  
 Miller, F. W., Graves, R. R., & Fohrman, M. H., 223.  
 Miller, W. T., & Schoening, H. W., 275.  
 Mitchell, D. M. See Wintrobe, M. M., et al., jt. authors, 269  
 Monnig, H. O., 273  
 — See also Ortlepp, R. J., jt. author, 274  
 Monnier & Lebasque, 232  
 Montgomerie, R. F., Bosworth, T. J., & Glover, R. E., 260  
 Morin, L. N., 262  
 Mornet, M., 239  
 Müller, A., 262  
 Munger, Myrtle & Huddleson, I. F., 252.  
 Murray, Sheila. See Duclou, H. J. J., et al., jt. authors, 270  
 Nagahata, S., & Ikegawa, S., 246  
 Nagel, H. C., 238  
 Naidu, P. M. N., 243  
 Nakamura, N., Ishi, S., & Watanabe, S., 239, *bis*  
 Neitz, W. O., 236  
 Northern Ireland, 280  
 Nungester, W. J. See Gunn, F. D., jt. author, 259  
 Ono, S., 246  
 Ortlepp, R. J., 246, 250  
 —, & Monnig, H. O., 274  
 Pabjanskas, A., 223  
 Paic, M., Krassnoff, D., Haber, P., Reimic, L., & Voet, J., 238.  
 Paltrinieri, S., & Ghinelli, I., 225.  
 Parish, H. J. See Buttle, G. A. H., jt. author, 274  
 Parkin, B. S., 233  
 Peel, E. See van Hoof, L., et al., jt. authors, 233.  
 Pervulin, B., 230.  
 Peterson, E. H., Hastings, E. C., & Hadley, F. B., 217.  
 Philipp, J. *anim. Indust.*, 279  
 Pieper, H., 272.  
 Pigouy, L., 235.  
 —, Borde, R., & Bernard, M., 240  
 Pirie, J. H. H., 222  
 van der Plank, G. M., 265  
 Pockrandt, D., 273  
 Pohl, G., 271.  
 Pozerski, E., & Guélin, A., 232  
 Quast, P., 277  
 Radojević, M., 218  
 Ramon, G., Bovin, A., Richou, R., Djouritch, M., & Maccolini, R., 254  
 Rao, M. A. N., 250  
 Raper, J. See Sprunt, D. H., et al., jt. authors, 277.  
 Ray, N. N., & Das, G. C., 254  
 Regan, W. M., Mead, S. W., & Gregory, P. W., 243.  
 Reimé, L. See Paic, M., et al., jt. authors, 238.  
 —, van Rensburg, S. W. J., 274  
 Reyes, N. C. See Manresa, M., jt. author, 276  
 Richou, R. See Ramon, G., et al., jt. authors, 254.  
 Rimington, C., 257  
 — See also Fourie, P. J., jt. author, 256  
 Robertson, O. H., Coggeshall, L. T., & Terrell, E. E., 258  
 — See also Terrell, E. E., et al., jt. authors, 258  
 Robin, V., 220  
 Roets, G. C. S., 275.  
 Roman, G. See Lafenêtre, H., jt. author, 225  
 de Rudder, 260.  
 Russeff, C., 219  
 —, & Henninger, E., 222  
 Sabin, F. R. See Joyner, A. L., jt. author, 221.  
 Sal, G., 255  
 Sánchez Botija, C., 236  
 Sautet, J. See Joyeux, C., jt. author, 235  
 Sautter, V. See Lépine, P., jt. author, 242  
 Schlegel, M., 262  
 Schleifstein, J., 242  
 Schoening, H. W. See Miller, W. T., jt. author, 275  
 Schoop, G., 271  
 Schreyer, W., 275  
 Scott, R. B., 268  
 Smuts, D. B. See du Toit, P. J., et al., jt. authors, 267.  
 Southern Rhodesia, 280.  
 Sprunt, D. H., McDearman, Sara, & Raper, J., 277.  
 Standtuss, R., 271  
 Stang, 265.  
 Sterne, M., & Mason, J. H., 231  
 Stewart, C. M., 261  
 Steyn, D. G., 276.  
 Steyn, H. P. See Mason, J. H., et al., jt. authors, 230.  
 Strazberger, S., 255.  
 Strter, V., 229  
 — See also Voskresenski, B., et al. authors, 227.  
 Suermann, H., 271  
 Sutton, G. D., 276  
 Tajima, Y. See Itabashi, K., et al., jt. authors, 224.  
 Tarasov, I., 224, 228, 230, *bis*, 272  
 —, & Versilova, P., 226  
 Terrell, E. E., Robertson, O. H., & Coggeshall, L. T., 258.  
 — See also Robertson, O. H., et al., jt. authors, 258.  
 Theiler, A., du Toit, P. J., & Malan, A. I., 267  
 Thomsen, M., 217  
 Tiraferr, E., 225.  
 du Toit, P. J., & Malan, A. I., 268  
 —, Smuts, D. B., & Malan, A. I., 267  
 — See also Malan, A. I., et al., jt. authors, 267.  
 — See also Theiler, A., et al., jt. authors, 267.  
 Trager, W., 241.  
 Trinidad and Tobago, 280  
 Truche, M., 223  
 Uhl, E., 245  
 Vasilescu, C. See Dimulescu, G., jt. author, 246  
 Versilova, P., 272.  
 — See also Kotjarova, N., jt. author, 226  
 — See also Tarasov, I., jt. author, 226.  
 — See also Voskresenski, B., et al., jt. authors, 227  
 Versilova, P. A., 227  
 Virga, E., 243.  
 Voet, J. See Paic, M., et al., jt. authors, 238.  
 Voskresenski, B., Versilova, P., & Strter, V., 227  
 Waldmann, 238  
 Walsh, T. E., & Cannon, P. R., 253  
 Warrington Yorke See King, H., et al., jt. authors, 273  
 Watanabe, S. See Itabashi, K., et al., jt. authors, 224  
 — See also Nakamura, N., et al., jt. authors, 239, *bis*.  
 Webster, L. T., & Wright, F. H., 240.  
 Wenzler, G. See Carstens, P., et al., jt. authors, 265  
 van der Westhuisen, O. P., 248  
 Williams, W. L., 217  
 Winsser, J. See Klarenbeek, A., jt. author, 237.  
 Wintrobe, M. M., Mitchell, D. M., & Kolb, L. C., 269  
 Wipprecht, C., & Horlacher, W. R., 263.  
 Wohlfel, T., & Wollenberg, H., 219, 233  
 Wollenberg, H. See Wohlfel, T., jt. author, 219, 233.  
 Wright, F. H. See Webster, L. T., jt. author, 240  
 Wu, K., 249.  
 — See also Kau, L. S., jt. author, 250  
 Yankovitch, J., 221  
 Zuckner, M. See Bellet, K., jt. author, 256

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

#### **Books for Review.**

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

#### **Reprint Collection.**

The Bureau now has a very extensive collection of reprints dating from about 1930. These are kept in safe custody and are available for reference by those visiting the Bureau.

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics: Technique; Reports and Book Reviews. \* See supplementary list below].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI... ..	285-302	DISEASES, GENERAL :	
Mastitis .. ..	285	[General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases, and Neoplasms] ..	328-334
Staphylococcal infection .. ..	286	Allergic Constitutional Diseases ... ..	329
Anthrax .. ..	286	Foot Rot in Sheep ... ..	331
Tuberculosis ... ..	287	NUTRITION IN RELATION TO DISEASE :	
Corynebacterium equi infection .. ..	291	[Articles placed in the section "Diseases, General" may also contain references to nutritional factors] .. ..	334-337
Fowl coryza ... ..	293	PUBLIC HEALTH ... ..	337-338
Pasteurella infection... ..	293	THERAPEUTICS .. ..	338-341
Salmonella infection... ..	294	Sulphamide compounds .. ..	338
Brucella infection .. ..	295	POISONS AND POISONING... ..	341-344
Mycosis .. ..	301	PHYSIOLOGY .. ..	344-346
DISEASES CAUSED BY PROTOZOAN PARASITES .. ..	302-308	TECHNIQUE AND APPARATUS ..	346-349
Trypanosomiasis .. ..	303	MISCELLANEOUS .. ..	349-350
Trichomoniasis .. ..	306	REPORTS .. ..	351-358
Various .. ..	306	Great Britain .. ..	351
DISEASES CAUSED BY VIRUSES ..	308-318	India .. ..	354
Foot and mouth disease .. ..	308	Southern Rhodesia .. ..	358
Equine encephalomyelitis .. ..	310	U.S.A. .. ..	358
Aujeszky's disease .. ..	310	BOOK REVIEWS .. ..	358-360
Rabies... ..	311		
Vaccinia .. ..	315		
Avian virus infections .. ..	317		
PARASITES IN RELATION TO DISEASE [ARTHIPODS] .. ..	318-320		
PARASITES IN RELATION TO DISEASE [HELMINTHS]... ..	320-326		
Trematode infestation .. ..	320		
Cestode infestation .. ..	321		
Nematode infestation .. ..	322		
IMMUNITY [including Allergic and Serological Diagnosis] ..	326-328		

### \* SUPPLEMENTARY LIST OF ABSTRACTS

Tuberculosis .. ..	See pp. 359-360.
Tuberculin test .. ..	See p. 346.
Pullorum disease and Avian coccidiosis ..	See p. 331.

# INDEX TO AUTHORS

- Abbott, S. G., 351, *bis*.  
 Abdussalam, M., 323.  
 Adm. Rep. Baluchistan Agency, 1936-1937, 355  
 Africa, 2nd int. Conf. Protection Flora and Fauna, 349.  
 di Aichelburg, U., 294  
 Alexander, A., 351.  
 Allan, H. B., 287  
 Allen, Fna A., 307  
 Amies, C. R., 316  
 Andrews, J. S., 323  
 Asimov, G. J., & Krouze, N. K., 346.  
 Bailly, J. See Remlinger, P., *jt* author, 310, *bis*, 311  
 Bandow, F. See Jenke, M., *jt* author, 347.  
 Bartels & Rosenberger, 319  
 Bauer, J. H., & Pickels, E. G., 319  
 Baumann, R., 333  
 Beauvillain, A. See Trillat, A., *jt* author, 314.  
 Behrens, H., 332  
 Belmonto, C., 314.  
 Benadinsky, C. V. See Kurotchkin, T. J., *jt* author, 328  
 Bendixen, H. C., & Jepsen, A., 291  
 Berthelon See Lesbouyries, *jt* author, 285.  
 Beumer, J., 286  
 Beveridge, W. I. B., 341, *ter*  
 Blumenthal, F. I., & Snow, J. S., 302  
 Bohlman, H., 338  
 Bol mens Direc Ganad, Montevideo, 287  
 Bonnin, F., 302  
 Breedis, C. See Furth, J., *jt* author, 318  
 Briese, R. R., & Couch, J. F., 341  
 Brntup, A., 332  
 Brit med. J., 346  
 Broom, J. C. See Brown, H. C., *jt* author, 305  
 Brown, H. C. & Broom, J. C., 305  
 Brüggemann, J., & Rathsfeld, H., 346  
 Brumpt, E., 306  
 Bull. Seiv zootech Epiz A O F., 340  
 Bywater, H. E., 351  
 Campbell, T. G., 319.  
 Capodaglio, A., 337  
 Cardona, L., 304  
 Carvalho, A., & Vidal, C., 291  
 Caudron, M. F., 292.  
 Cauthen, G. E. See Riddle, O., *jt* author, 344  
 Chiles, J. A., Jr., & Severinghaus, A. E., 349  
 Chinn, B. D., 338  
 Chorley, J. K., 358  
 Christnach, 346  
 Claude, A., 318  
 Colson, M. See Jacotot, H., *et al*, *jt* authors, 311  
 Couch, J. F. See Briese, R. R., *jt* author, 341  
 Craige, J., & Wishart, F. O., 311.  
 Crawford, M., 308  
 Cruveilhier, L., Lepine, P., & Viala, C., 311.  
 Curasson, G., 308  
 Curson, H. H., & Neitz, W. O., 318.  
 Daengevang, S. See Prommas, C., *jt* author, 324.  
 Darraspen, E., Florio, R., & Meymandi, M., 313  
 Davidson, F. A., 287.  
 Davis, R. T., 356.  
 Delbé, P., 297.  
 Delpy, L., & Rastegar, R., 293.  
 Dercelle, E., 344  
 Dieter, R., 291, 338.  
 Doderio, J., 311.  
 Doig, A. T., Gemmill, G., Kayne, G. G., Linggood, F. V., Parish, H. J., & Westwater, J. S., 326.  
 Do-Van-Vien. See Granouillit, F., *jt* author, 304  
 Dubois, C., 298, *bis*, 299.  
 Ehrismann, O., 301  
 Ehrlich, C., 337.  
 El-Gheriany, M. G., 285  
 Elvehjem, C. A. See Woolley, D. W., *et al*, *jt* authors, 336.  
 Eskridge, Lydia. See Hegner, R., *jt* author, 307.  
 Espantoso, M. See Rubino, M. C., *jt* author, 313.  
 Famulari, S. See Izar, G., *jt* author, 300.  
 Farbrother, E. S., 356.  
 Fatio, D. M. See Saenz, A., *jt* author, 291.  
 Faust, E. C., 325  
 Feldman, W. H., 359  
 Feng, L. C., 325.  
 Finch, R., 351.  
 Findlay, G. M., & MacCallum, F. O., 339  
 Fischer, H., & Herrle, K., 347  
 Fitch, C. P., Roepke, M. H., & Thompson, C. M., 327.  
 Fleming, A., 338  
 Florio, R. See Darraspen, E., *et al*, *jt* authors, 313.  
 Flodorf, E. W., & Mudd, S., 348, *bis*  
 — See also Scherp, H. W., *et al*, *jt* authors, 314.  
 Folger, A. F., 288.  
 Folley, S. J., 345  
 Fraser, A. H. H., Godden, W., Snook, L. C., & Thomson, W., 336  
 Fraser, F. R., 345.  
 Fienkel, H. S., & van Waveren, G. M., 308  
 Furth, J., & Breedis, C., 318.  
 Gambles, R. M., 330.  
 Garewal, J. S., 357.  
 Gemmill, G. See Doig, A. T., *et al*, *jt* authors, 326.  
 le Gentil, P., 286  
 Ghose, S. C., 354  
 Gins, H. A., Kroemer, G., & Link, T., 327  
 Giroud, A. See Giroud, P., *jt* author, 336  
 Giroud, P., & Giroud, A., 336  
 Godden, W. See Fraser, A. H. H., *et al*, *jt* authors, 336  
 Goftho, A., 351.  
 Goret, P., & Lelandais, E., 313  
 —, & Mariette, C., 311  
 Grub, E., & Zschokke, W., 289  
 Granouillit, F., & Do-Van-Vien, 304  
 Great Britain, Stat. Gen. Rep. Army vet Serv., 1937-1938, 354  
 Groenewald, J. W., 335  
 Guenther, D. F., 350  
 Guillaume, M. See Weinberg, M., *jt* author, 327.  
 Gullberg, J. E. See Wagman, I. H., *jt* author, 336  
 Hawley, H. See Shortt, H. E., *et al*, *jt* authors, 348.  
 Hecht, S., & Mandelbaum, J., 336.  
 Hees, E. See Wagner, O., *jt* author, 306.  
 Hegner, R., & Eskridge, Lydia, 307  
 Herrle, K. See Fischer, H., *jt* author, 347.  
 Hoare, F. D., 338.  
 Horning, F. O., 328  
 Holmes, R. P., 351.  
 Holz, K., 309  
 Howie, G., 351.  
 Hughes, T. P., Parker, R. L., & Rivers, T. M., 315  
 Imai, Y., & Moriawaki, D., 334  
 India, Agric. and Annm. Husbandry in, 1935-36, 354.  
 Ishii, S., Watanabe, S., & Ozaki, M., 312.  
 Iwanoff, X., 320, *bis*.  
 Izar, G., & Famulari, S., 300.  
 Jabotinski, J., 310.  
 Jacotot, H., 293, *bis*, 311.  
 —, Colson, M., & Le Roux, G., 311.  
 Jenke, M., & Bandow, F., 347.  
 Jensen, Elsa, 338.  
 Jepsen, A. See Bendixen, H. C., *jt* author, 291.  
 Johnstone, W. K., 351.  
 Kaarde, J., 285.  
 Kaarve, A., & Tartler, G., 294.  
 Kayne, G. G. See Doig, A. T., *et al*, *jt* authors, 326.  
 Kerr, P. J., 356.  
 Knajtner, S., 317.  
 de Kock, G., du Toit, R., & Neitz, W. O., 313.  
 Kownatzki, D. A., 331.  
 Krause, C., 288.  
 Krauss, F., 346.  
 Krauter, A. W., 333.  
 Krembs, J., 314.  
 Kress, F., 300.  
 Krishnengar, K., 357.  
 Kroemer, G. See Gins, H. A., *et al*, *jt* authors, 327.  
 Krouze, N. K. See Asimov, G. J., *jt* author, 346.  
 Kujumgieff, I., 306.  
 Kurotchkin, T. J., & Benadsky, C. V., 328.  
 Lane, C., 325  
 Langdon-Brown, W., 341  
 Laporre, R. See Rochei, H. L., *jt* author, 290  
 Larson, C. L., 319.  
 Lauroy, L., 305  
 Leach, C. N., 312.  
 Lelandais, E. See Goret, P., *jt* author, 313  
 Lepine, P. See Cruveilhier, L., *et al*, *jt* authors, 311.  
 Lesbouyries, & Berthelon, 285  
 Letard, E., 350.  
 Levine, P. P., 340.  
 Linggood, F. V. See Doig, A. T., *et al*, *jt* authors, 326.  
 Link, T. See Gins, H. A., *et al*, *jt* authors, 327.  
 Live, I., & Stubbs, E. L., 325  
 Lloyd, H. M., 319  
 Lobel, L. W. M., van der Schaaf, A., & Roza, M., 297.  
 Locke, R. C., 351.  
 Long, E. R. See Nelson, W. E., *et al*, *jt* authors, 346.  
 MacCallum, F. O. See Findlay, G. M., *jt* author, 339.  
 Maccolini, R., 295  
 MacFarlane, M. G., & Salaman, M. H., 316.  
 MacGregor, A. D., 356.  
 Mackinnon, J. E., 301.  
 McLean, A., 351.  
 Madden, R. J. See Woolley, D. W., *et al*, *jt* authors, 336.  
 Magara, M., 328.  
 Malan, A. I. See Theiler, A., *et al*, *jt* authors, 334.  
 Mandelbaum, J. See Hecht, S., *jt* author, 336.  
 Manley, F. H., 351.  
 Mariette, C. See Goret, P., *jt* author, 311.  
 Martignolles, 305.  
 Martini, I., 340.  
 Matthews, F. P., 342.  
 Matthews, H. T., 351.  
 Meijer, W. C. P., 321.  
 Meissner, H., 296.  
 Merck's Yearbook, 350.  
 Messing, S. See Schmidt, J., *jt* author, 289.  
 Meymandi, M. See Darraspen, E., *et al*, *jt* authors, 313.  
 Monari, D., 289.  
 Montgomerie, R. F., 340.  
 Moriawaki, D. See Imai, Y., *jt* author, 334.  
 Mostarda, G., 332.  
 Moulart, 321.

# Index

- de Moulin, F., 344.  
Moulis, 339.  
Mudd, S. See Flörsdorf, E. W., *jt* author 348, *bus*.  
Müssmeier, 328.  
Murphy, J. M. See Stubbs, E. L., *jt* author, 334.  
Murray, C. A., 354.  
Negri, R., 320.  
Neitz, W. O., 307.  
— See also Curson, H. H., *jt* author, 318.  
— See also de Kock, G., et al, *jt* authors, 313.  
Nélis, P., 296.  
Nelson, J. B., 293, 316.  
Nelson, W. E., Seibert, Florence B., & Long, E. R., 346.  
Nesgovorov, B. See Vershlova, P., et al, *jt* authors, 297.  
Nieberle, K., 290, 359.  
van Nickerk, P. le R., 347.  
Nielsen, F. W., 290.  
N. Amer Vet, 341.  
Oakley, C. L., 339.  
O'Callaghan, W. P., 301.  
Oehlkers, H., 306.  
Olitsky, P. K. See Sabin, A. B., *jt* author, 310, *bus*.  
Olsen, O. W., 321.  
Ozaki, M. See Ishii, S., et al, *jt* authors, 312.  
Ozzano, T., & Re, C., 301.  
Pacini, A. J., 341.  
Parish, H. J. See Doug, A. T., et al, *jt* authors, 326.  
Parker, R. F., 316.  
—, & Rivers, T. M., 315, *ter*.  
—, & Smythe, C. V., 315.  
— See also Hughes, T. P., et al, *jt* authors, 315.  
Parnes, J., 334.  
Pasinati, P., 302.  
Pavlov, P. See Vershlova, P., et al, *jt* authors, 297.  
Pawan, J. L., 312.  
Pegreff, G., 320.  
Penso, G., 320.  
Phadke, V. R., 356.  
Pickels, E. G., & Smadel, J. E., 316.  
— See also Bauer, J. H., *jt* author, 319.  
— See also Smadel, J. E., et al, *jt* authors, 316.  
Pierot, 309, *bus*.  
Pigoury, L., 287, 308.  
Piotte, 309.  
Pizzetti, G., 317.  
Plum, N., 289.  
Pochon, J., 326.  
Pollard, A., 317.  
Popov, I., 300.  
Porter, D. A., 322.  
Potter, T. S., 291.  
Pritchett, H. D., 323.  
Prommas, C., & Daengevang, S., 324.  
Quin, J. I. See Rimington, C., et al, *jt* authors, 343.  
Quirke, T. F., 357.  
Rastegar, R. See Delpv, L., *jt* author, 295.  
Rathsfield, H. See Brüggemann, J., *jt* author, 346.  
Rau, B. See Zeile, K., *jt* author, 347.  
Ray, H. M., 319.  
Re, C. See Ozzano, T., *jt* author, 301.  
Records, E., & Vawter, L. R., 310.  
Reichenow, E., 303.  
Remete, T., 290.  
Remlinger, P., & Bailly, J., 310, *bus*, 311.  
Rep. Hlth City Manchr., 1937, 351.  
Rep. Hlth Serv. West Ham, 1936, 351.  
Rep. med. Offr Hlth, Aberdeen, 1937, 351.  
Rep. med. Offr Hlth, Bolton, 1937, 351.  
Rep. med. Offr Hlth, Liverpool, 1936, 351.  
Rep. med. Offr Hlth, Liverpool, 1937, 351.  
Rep. med. Offr Hlth, Preston, 1937, 351.  
Rep. med. Offr Hlth, Salford, 1936, 351.  
Rev. Abatt, 349.  
Rhodes, A. J., & van Rooyen, C. E., 339.  
Rhod. agric. J., 357.  
Riddle, O., & Cauthen, G. E., 314.  
Riedmüller, L., 286.  
Riley, P. B., 356.  
Rimington, C., Quin, J. I., & Roets G. C. S., 343.  
—, & Roets, G. C. S., 343.  
—, & Steyn, D. G., 343.  
Rushworth, H. R., 347.  
Rivers, T. M. See Hughes, T. P., et al, *jt* authors, 315.  
— See also Parker, R. F., *jt* author, 315, *ter*.  
Rocher, H. L., & Laporte, R., 290.  
Roemmel, O., 295.  
Roepke, M. H. See Fitch, C. P., et al, *jt* authors, 327.  
Roets, G. C. S. See Rimington, C., *jt* author, 343.  
— See also Rimington, C., et al, *jt* authors, 343, *bus*.  
van Rooyen, C. E. See Rhodes, A. J., *jt* author, 339.  
Rosenberger See Bartels, *jt* author, 319.  
le Roux, G. See Jacotot, H., et al, *jt* authors, 311.  
Roza, M. See Lobel, L. W. M., et al, *jt* authors, 297.  
Rubino, M. C., 309.  
—, & Espantoso, M., 313.  
Sabín, A. B., & Olitsky, P. K., 310, *bus*.  
Saenz, A., 291.  
—, & Fatio, D. M., 291.  
Salaman, M. H. See MacFarlane, M. G., *jt* author, 316.  
Sandground, J. H., 324.  
Santagostino, C., 295.  
van der Schaaf, A. See Lobel, L. W. M., et al, *jt* authors, 297.  
Schäper, W., 329.  
Scherp, H. W., Flörsdorf, E. W., & Shaw, Dorothy R., 314.  
Schmidt, H. W., 290, *bus*.  
Schmidt, J., & Messing, S., 289.  
Schwetz, J., 303.  
Seibert, Florence B. See Nelson, W. E., et al, *jt* authors, 346.  
Sen, S. C., 322.  
Severinghaus, A. E. See Chiles, J. A., Jr., *jt* author, 349.  
Shahan, M. S., 302.  
Shaw, Dorothy R. See Scherp, H. W., et al, *jt* authors, 314.  
Shedlovsky, T. See Smadel, J. E., et al, *jt* authors, 316.  
Shortt, H. E., Hawley, H., & Swaminath, C. S., 348.  
Simitch, T., 306.  
Smadel, J. E., Pickels, E. G., & Shedlovsky, T., 316.  
— See also Pickels, E. G., *jt* author, 316.  
Smythe, C. V. See Parker, R. F., *jt* author, 315.  
Snook, L. C. See Fraser, A. H. H., et al, *jt* authors, 336.  
Snow, J. S. See Blumenthal, F. L., *jt* author, 302.  
Solovjev, A., 298.  
Spray, R. S., 338.  
Stamatini, L., 340.  
Steyn, D. G., 342.  
— See also Rimington, C., et al, *jt* authors, 343.  
Stockmayer, H. W., 299.  
Strong, F. M. See Woolley, D. W., et al, *jt* authors, 336.  
Strong, R. P., 324.  
Stubbs, E. L., & Murphy, J. M., 334.  
— See also Love, I., *jt* author, 325.  
Stutzki, H., 349.  
Swaminath, C. S. See Shortt, H. E., et al, *jt* authors, 348.  
Tabusso, M. E., 286, 331.  
Taranino, G., 319.  
Tartler, G. See Karies, A., *jt* author, 294.  
Taylor, E. L., 323.  
Theiler, A., du Toit, P. J., & Malan, A. L., 334.  
Thompson, C. M. See Fitch, C. P., et al, *jt* authors, 327.  
Thomsen, A., 296.  
Thomson, W. See Fraser, A. H. H., et al, *jt* authors, 336.  
Thornton, H., 351.  
Toba, A., 296.  
du Toit, P. J. See Theiler, A., et al, *jt* authors, 334.  
du Toit, R. See de Kock, G., et al, *jt* authors, 313.  
Torrance, H. L., 287.  
Trillat, A., & Beauvillain, A., 314.  
Ueberreiter, O., 360.  
U.S.A. Ann Rep Surg. Gen Publ. Hlth Serv., 1937, 258.  
Urban, A., 360.  
Vawter, L. R. See Records, E., *jt* author, 310.  
Verge, J., 326.  
Vershlova, P., Pavlov, P., & Nesgovorov, B., 297.  
Viala, C. See Cruveilhier, L., et al, *jt* authors, 311.  
Vidal, C. See Carvalho, A., *jt* author, 291.  
Viljoen, N. P., 321.  
Violle, H., 299.  
Wackerbarth, G., 297.  
Wagman, I. H., & Gullberg, J. E., 336.  
Wagner, O., & Hees, E., 306.  
Watanabe, S. See Ishii, S., et al, *jt* authors, 312.  
van Waveren, G. M. See Frenkel, H. S., *jt* author, 308.  
Wehr, F. E., 324.  
Wedlich, N., 330.  
Wenbergh, M., & Guillaume, M., 327.  
Weitzberg, R., 337.  
Westwater, J. S. See Doug, A. T., et al, *jt* authors, 326.  
Whitby, L. E. H., 338.  
Wishart, F. O. See Craigie, J., *jt* author, 314.  
Woolley, D. W., Strong, F. M., Madden, R. J., & Elvehjem, C. A., 336.  
Yen, C. H., 325.  
Ymaz Appathie, I. L., 322.  
Zeile, K., & Rau, B., 347.  
Zeiss, H., 304.  
Zschokke, W. See Gräub, E., *jt* author, 289.

## ERRATUM

*P.B. 9. 247. 1. 17, for tanks read banks*

PRINTED IN GREAT BRITAIN.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

#### **Books for Review.**

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

#### **Reprint Collection.**

The Bureau now has a very extensive collection of reprints dating from about 1930. These are kept in safe custody and are available for reference by those visiting the Bureau.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI ... ..	361-379	DISEASES, GENERAL :	
Streptococcal infection ... ..	361	[General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms] ...	406-415
Staphylococcal infection ... ..	363		
Tuberculosis ... ..	364	NUTRITION IN RELATION TO DISEASE :	
Corynebacterium infection ... ..	368	[Articles placed in the section " Diseases, General " may also contain references to nutritional factors] ... ..	415-419
Swine erysipelas ... ..	369		
Pasteurella infection ... ..	370	PUBLIC HEALTH ... ..	419-421
Salmonella infection ... ..	372	Milk hygiene ... ..	419
Brucella infection ... ..	373	Meat hygiene ... ..	420
Anaerobic infection ... ..	376	Therapeutics ... ..	421-428
Mycosis ... ..	379	Poisons and Poisoning ... ..	428-430
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	379-387	Physiology ... ..	430-433
Trypanosomiasis ... ..	379	Technique and Apparatus ... ..	433-434
Trichomoniasis ... ..	382	Miscellaneous ... ..	434-436
Toxoplasmosis ... ..	383	Reports ... ..	436-442
Piroplasmiasis ... ..	385	Australia: New South Wales ... ..	436
DISEASES CAUSED BY VIRUSES ... ..	387-392	Canada ... ..	437
Foot and mouth disease ... ..	388	Cyprus ... ..	439
Equine encephalomyelitis ... ..	389	Malaya ... ..	440
Rabbit myxoma and fibroma ... ..	391	Jamaica ... ..	441
		U.S.A.: Michigan ... ..	441
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ... ..	393-397	BOOK REVIEWS ... ..	442-444
Sheep blowfly ... ..	393		
PARASITES IN RELATION TO DISEASE [HELMINTHS] ... ..	397-402		
General ... ..	397		
Cestode infestation ... ..	398		
Nematode infestation ... ..	400		
IMMUNITY [including Allergic and Serological Diagnosis] ... ..	402-406		

# INDEX TO AUTHORS

- Adamesteanu, I. See Panu, A., et al., jt. authors, 415.
- Ahlström, C. G. See Andrewes, C. H., jt. author, 392.
- Ajello, P., 378.
- Aicata, J. E., 399.
- Allard, E. U., 420.
- Allison, V. D., 361.
- Allmark, M. G. See Morrell, C. A., et al., jt. authors, 426.
- de Almeida, J. L. See Barretto, J. F., jt. author, 382.
- Anderson, E. O., & Plastryge, W. N., 361. — See also White, G. C., et al., jt. authors, 361.
- Anderson, J., & Daubney, R., 432.
- Anderson-Stewart, B. See Meyer, K. F., et al., jt. authors, 387.
- Andrewes, C. H., & Ahlström, C. G., 392.
- Archibald, J. G., Kuenski, K. J., Brooke, R. O., & Freeman, S. L., 416.
- Aubertin, E., Richard, J., & Perrineau, G., 368.
- Australia, New South Wales, 436.
- Bachman, G. W., & Gonzalez, J. O., 401.
- Balmus, G. See Slatineau, A., et al., jt. authors, 381.
- Balmus, P. See Slatineau, A., et al., jt. authors, 381.
- Barbani, E., 372.
- Barnes, J. E., 410.
- Barretto, J. F., & de Almeida, J. L., 382.
- Bartels, 397.
- , & Döring, J., 397.
- Bauer, H., & Gunderson, M. F., 423.
- Beaudette, F. R., 373.
- Benesch, F., 424.
- Bengtson, J. S., 412.
- van den Bergh, L., 401.
- Berry, G. P., 391.
- Bevan, I. E. W., 423.
- Bigger, N. W., 369.
- Birks, H. R., 426.
- Bloch, F., & Costil, L., 367.
- Blumer, C. G., & Hindmarsh, W. L., 409.
- Böe, F., 432.
- Boenig, 408.
- Boquet, F., 370.
- Bower, J. O., Mengle, H. A., & Payson, N. F., 405.
- Boyd, W. C. See Hooker, S. B., jt. author, 102.
- Boynton, W. H., Woods, Gladys M., & Wood, F. W., 390.
- Braga, A., 373.
- , See also Valle, A. I., et al., jt. authors, 376.
- Braila, J., & Cernaianu, C., 436.
- Brit. med. J., 363, 383.
- Brocq-Rousseau, D., & Urbain, A., 362.
- Brooke, R. O. See Archibald, J. G., et al., jt. authors, 416.
- Brown, E., 419.
- Brumpt, E., 385.
- Buckley, J. J. C., 401.
- Bueno, I. See Meyer, J. R., et al., jt. authors, 418.
- Bunney, W. E. See Gottschall, R., jt. author, 402.
- Butozan, V., 374.
- Carneiro, V., 389.
- Carpano, M., 366, *bis*.
- Celoria, M., 402.
- Cernaianu, C. See Braila, J., jt. author, 436.
- Chambers, F., 412.
- Chapman, C. W. See Morrell, C. A., et al., jt. authors, 426.
- Chiti, G., 367, *bis*.
- Clavel, C. See Sédallian, P., et al., jt. authors, 404, *bis*.
- Clowes, G. H. A. See Helmer, O. M., jt. author, 413.
- Colony and Protectorate of Kenya, 437.
- Common, R. H., & Kerr, W. R., 373.
- Cordier, G., 376.
- Costil, L. See Bloch, F., jt. author, 367.
- Couture, G. W. See White, G. C., et al., jt. authors, 361.
- Craig, J. F., & Davies, G. O., 365.
- Crimm, P. D., & Short, D. M., 418.
- Cyrasson, K. G., 364.
- Cyprus, 439.
- Danckwort, P. W., & Gabel, W., 428.
- Daubney, R. See Anderson, J., jt. author, 432.
- Davies, G. O. See Craig, J. F., jt. author, 365.
- Davis, G. K., & Maynard, L. A., 427.
- Debelic, S., 365.
- Dehmel, H. See Wolters, K. L., jt. author, 403.
- Delpy, L., & Rafiza, A., 384.
- Detroyat, C. See Rossi, S., jt. author, 387.
- Dickinson, E. M., & Hindshaw, W. R., 426.
- Dingle, J. H. See Fothergill, L. R. D., jt. author, 390.
- Djaenodin, R. See Kraneveld, F. C., jt. author, 377.
- Doenecke, H. See Lagel, R., Jr., et al., t. authors, 444.
- Döring, J. See Bartels, jt. author, 397.
- Donatien, A., & Lestoquard, F., 386.
- Doty, A. E., 396.
- Dschunkowsky, E., 386.
- Dufour, J. See Nattan-Larner, L., et al., jt. authors, 406.
- Dzasochov, G. S., 393.
- Earle, K. V., 430.
- Eaton, M. D., 405.
- Eddie, R. See Meyer, K. F., et al., jt. authors, 387.
- Edgar, G., 390.
- Edgington, B. H. See Frank, N. A., jt. author, 372.
- Edwards, J. T., 417.
- Eichmann, 408.
- Engle, K. See Wetzler, R., jt. author, 398, *ter*.
- Euler, 382.
- Evans, R. J., & Phillips, P. H., 415.
- , —, & Hart, E. B., 415.
- Farina, A., 426.
- Feldman, W. H., 435.
- Fenstermacher, R., 413.
- Ferrán, J. V., 390.
- Filmer, J. F., 410.
- Fitch, L. W. N., 414.
- Foggie, A., 428.
- Folger, A. F., 365.
- Forgot, P. See Weinberg, M., et al., jt. authors, 368.
- Fothergill, L. R. D., & Dingle, J. H., 390.
- France, G., 442.
- Frank, N. A., & Edgington, B. H., 372.
- Franzen, M., 408.
- Freeman, S. L. See Archibald, J. G., et al., jt. authors, 416.
- Freney, M. R., 394.
- Fuller, M. E. See Mackerras, I. M., jt. author, 394.
- Gabel, W. See Danckwort, P. W., jt. author, 428.
- Gajbov, A. D. See Petrov, A. M., jt. author, 427.
- Gargano, P., 363.
- Geel, M., 419.
- Gehring, K. See Richter, J., jt. author, 409.
- Gentile, A. See Sforza, M., jt. author, 411.
- Gildow, E. M., Williams, J., & Lampman, C. E., 413.
- Giltner, W., 420, 441.
- Girardon, C. A., 436.
- de Girolamo, A., 425.
- Goertler, F., 408.
- Gonzalez, J. O. See Bachman, G. W., jt. author, 401.
- Gopalakrishnan, V. R. See Rajagopalan, V. R., jt. author, 368.
- Gorer, P. A., 412.
- Gottschall, R., & Bunney, W. E., 402.
- Grace, L. B. A., 420.
- Graham, N. P. H., 427.
- Green, H. H., 415.
- Greene, R., & Morgan, H. R., 368.
- Griffith, A. A., & Smith, J., 367.
- Guerra, P. See Langeron, M., jt. author, 379.
- Gunderson, M. F. See Bauer, H., jt. author, 423.
- Hammersland, Hazel, & Joneschild, E. M., 369.
- Hanlon, G., 429.
- Hansen, H. C. See Shaw, A. O., et al., jt. authors, 361.
- Hart, E. B. See Evans, R. J., et al., jt. authors, 415.
- Hart, L., 369, 371.
- Harwood, P. D., & Luttermoser, G. W., 400.
- Hayden, C. E., 431.
- Heineman, P. G., 434.
- Helm, R., 426.
- Helmer, O. M., & Clowes, G. H. A., 413.
- Henrad, C. See van Hoof, L., et al., jt. authors, 380, *bis*, 381.
- Henry, M., 396, 436.
- Hewitt, R., 382.
- Hindle, E., 387.
- Hindmarsh, W. L. See Blumer, C. C., jt. author, 409.
- Hinshaw, W. R. See Dickinson, E. M., jt. author, 426.
- Hoare, C. A., 379.
- Hoffstad, Rachel E., & Pilcher, K., 391.
- , & Pilcher, K. S., 391.
- Hofman, F., 388.
- Holth, H., 371.
- , & Røkke, B., 424.
- van Hoof, L., Henrad, C., & Peel, E., 380, *bis*, 381.
- Hooker, S. B., & Boyd, W. C., 402.
- Hoptengärtner, M., 442.
- Horgan, E. S., 391.
- Huber, F. L., & Kraneveld, F. C., 376.
- Hudson, A. W. See Peren, G. S., et al., jt. authors, 406.
- Hungerford, T. G., 416.
- Hurst, W. E., 391.
- Jacotot, H., 390.
- Jakob, H. See Lagel, R., Jr., et al., jt. authors, 444.
- Jamaica, 414.
- Johnson, R. E. See White, G. C., et al., jt. authors, 361.
- Joneschild, E. M. See Hammersland, Hazel, jt. author, 369.
- Jourdan, F. See Sédallian, P., et al., jt. authors, 404, *bis*.
- J. Dep. Agric. Eire, 407.
- Kerr, W. R., 373.
- , See also Common, R. H., jt. author, 373.
- Killham, B. J., 441.
- Kitt, 411.
- Klemola, V., 419.
- Klett, R., & Metzger, R., 444.
- Klieneberger, Emmy, 378.
- Knipling, E. F., & Rainwater, H. T., 395.
- Knoth, M., 421.
- Knuth, P., 435, *bis*.
- de Kock, G., 384.
- Koopmans, S. See Roos, J., it. author, 434.
- Kotlán, S., 397.

# Index

- Kranefeld, F. C., & Djaenoedin, R., 377.  
— See also Huber, F. L., *jt* author, 376  
Kucinski, K. J. See Archibald, J. G., et al.,  
*jt* authors, 416  
Kujumgieff, I., 372  
Kuppuswamy, A. R., 411  
  
Lägel, R., Jr., Doenneke, H., Jakob, H.,  
Oppermann, T., & Schönberg, F., 444  
Lahiri, L. M., 418  
Laja, P., 366  
Lampman, C. E. See Gildow, E. M., et al.,  
*jt* authors, 413  
Lancet, 422  
Langeron, M., & Guerra, P., 379  
Langpap, A., 421  
Lee, D. J., 394  
Legg, J. See Roberts, F. H. S., *jt* author,  
427  
Lemetayer, E. See Ramon, G., et al., *jt*  
authors, 404  
Lestouard, F. See Donatien, A., *jt*  
author, 386  
Levaditu, C., & Vaisman, A., 423, *bis*  
Lichtenheld, 435  
Lockett, S., 441  
Long, E. R., 364  
Lucker, J. T., 400  
Luttermoser, G. W. See Harwood, P. D.,  
*jt* author, 400  
Lyons, B. M., 389  
  
McClung, L. S. See McCoy, Elizabeth, *jt*  
author, 377  
McCoy, Elizabeth, & McClung, L. S., 377  
McCulloch, R. N., 394  
Macfarlane, W. V., 394  
Mackerras, I. M., & Fuller, M. L., 391  
Mackerras, M. J., 393  
Malaya, 440  
Mallmann, W. L., 412  
Mancini, A., 388  
Manusardi, L., 435  
Marcus, P. M., & Necheles, H., 425  
Marek, J., Wellmann, O., & Urbanyi, L.,  
419  
Maynard, I. A. See Davis, G. K., *jt*  
author, 427  
Mengle, H. A. See Bower, J. O., et al., *jt*  
authors, 405  
Menk, W., 424  
Menkun, V., 406  
Merle, A. See Weinberg, M., et al., *jt*  
authors, 398  
Metzger, R. See Klett, R., *jt* author, 444  
Meyer, J. R., 418  
—, Pamplona, A., & Bueno, P., 418  
Meyer, K. F., Eddie, B., & Anderson-  
Stewart, B., 387  
Mezaks, P., 416  
Michaellesco, M. See Panu, A., et al., *jt*  
authors, 415  
Milozorov, E. P., & Tchasovnikov, N.,  
377  
Minst. Agric. County Egg Laying Trials,  
407  
Montgomery, R. F. See Rowlands, W. T.,  
*jt* author, 366  
Moore, W., 393  
Moretti, B., 371  
Morgan, D. O., & Wilson, J. E., 397  
Morgan, H. R. See Greene, R., *jt* author,  
368  
Morrell, C. A., Chapman, C. W., & All-  
mark, A. M. G., 426  
Morton, A. C. See Peren, G. S., et al., *jt*  
authors, 406  
Moxon, A. L., 429  
Muende, I., & Webb, P., 379  
Mulligan, E. J., 437  
Murnane, D., 370  
Nadaud, M., 420  
Nattan-Larner, L., Steeg, L., & Dufour, J.,  
406  
Necheles, H. See Marcus, P. M., *jt*  
author, 425  
Newson, I. E., 410  
Newton, W. H., 433  
Nishiyama, S. See Sugimoto, M., *jt*  
author, 400  
Nobata, R. See Umeno, S., *jt* author,  
364  
Nobrega, P. C., & Reis, J., 371  
Nutting, R. C. See Shaw, A. O., et al., *jt*  
authors, 361  
O'Gorman, C. L., 427  
Olitsky, P. K. See Sabin, A. B., *jt* author,  
383  
Olt, A., 371  
Oppermann, T. See Lägel, R., Jr., et al.,  
*jt* authors, 444  
von Ostertag, R., 435  
  
Pamplona, A. See Meyer, J. R., et al., *jt*  
authors, 418  
Panu, A., Michaellesco, M., & Adame-  
steanu, J., 415  
Parsons, I., Dorothy, 414  
Paxson, N. F. See Bower, J. O., et al., *jt*  
authors, 405  
Peel, E. See van Hoof, L., et al., *jt* authors,  
380, *bis*, 381  
Penfold, H. B., 399  
— See also Penfold, W. J., et al., *jt*  
authors, 399  
Penfold, W. J., Penfold, H. B., & Phillips,  
Mary, 399  
Pehla, A. M., 369  
Pereira, C., 396  
Peren, G. S., Hudson, A. W., Morton,  
A. C., & Yates, C. C., 406  
Perrineau, G. See Aubertin, E., et al., *jt*  
authors, 368  
Petrov, A. M., & Gaybo, A. D., 427  
Phillips, Mary. See Penfold, W. J., et al.,  
*jt* authors, 399  
Phillips, P. H. See Evans, R. J., *jt* author,  
415  
— See also Evans, R. J., et al., *jt* authors,  
415  
Pigoury, L., 390  
Pilcher, K. See Hoffstadt, Rachel E.,  
*jt* author, 391  
Pilcher, K. S. See Hoffstadt, Rachel F.,  
*jt* author, 391  
Pirotsky, I., 403, *bis*  
Pitaluga, G., 383  
Plastridge, W. N. See Anderson, E. O., *jt*  
author, 361  
— See also White, G. C., et al., *jt* authors,  
361  
Plimmer, R. H. A., 413  
Prox. R. Soc. Med., 422, 425  
Prontosil. Bayer Products Ltd., 423  
Pullar, E. M., 369  
  
Rafiza, A. See Delpy, L., *jt* author, 384  
Rainwater, H. T. See Knupling, E. F., *jt*  
author, 395  
Rajagopalan, V. R., & Gopalakrishnan,  
V. R., 368  
Ramon, G., 404  
—, Lemetayer, E., & Richou, R., 404  
Rao, M. A. N., 401  
Rask-Nielsen, H. C., 414  
—, & Rask-Nielsen, R., 414  
Rask-Nielsen, R. See Rask-Nielsen, H. C.,  
*jt* author, 414  
Rathnow, H. D., 430  
Rav, J. D., 382  
Reis, J. See Nobrega, P., *jt* author, 371  
Rhodes, A. J. See van Rooyen, C. F., et al.,  
*jt* authors, 391  
Richard, J. See Aubertin, E., et al., *jt*  
authors, 368  
Richou, R. See Ramon, G., et al., *jt*  
authors, 404  
Richter, J., & Gehring, K., 409  
Ridala, V., 408  
Rivers, T. M., Ward, S. M., & Smadel,  
J. E., 391  
Roberts, F. H. S., 396  
—, & Legg, J., 427  
Roe, R. J., 439  
Roemmele, O., 388  
Røkke, B. See Holth, H., *jt* author, 424  
Roos, J., & Koopmans, S., 434  
van Rooyen, C. F., & Rhodes, A. J., 391  
Rossi, S., & Detroyat, C., 387  
Rouget, M., 416  
Rowlands, W. T., & Montgomerie, R. F.,  
366  
  
Sabin, A. B., & Olitsky, P. K., 383  
San Agustín, G., 409  
Santogostino, C., 375  
Scarpellini, M., 372  
Schönberg, F. See Lägel, R., Jr., et al., *jt*  
authors, 444  
Schulte, W., 365  
Schumann, 408  
Schwartz, R., 403  
Schwarzmaier, E. See Zwick, W., et al., *jt*  
authors, 389  
Schwerdt, 430  
Sédallan, P., Jourdan, F., & Clavel, C., 404,  
*bis*  
Seckles, I., 428  
—, & Sjöllema, B., 428  
Storza, M., & Gentile, A., 411  
Shaw, A. O., Hansen, H. C., & Nutting,  
R. C., 361  
Shillinger, J. E., 408  
Short, D. M. See Cramm, P. D., *jt* author,  
418  
Sjöllema, B. See Seckles, I., *jt* author,  
428  
Slatineau, A., Balmus, G., & Balmus, P.,  
381  
Smadel, J. E. See Rivers, T. M., et al., *jt*  
authors, 391  
Smith, J. See Griffith, A. A., *jt* author,  
367  
Smith, J. H., 407  
Soldner, I., 433  
Stabler, R. M., 382  
Stateth, N. J., 372  
Steeg, L. See Nattan-Larrier, L., et al., *jt*  
authors, 406  
Steger, G., 431  
Stritz, B., 363  
Striter, V. See Versilova, P., *jt* author,  
375  
Sugimoto, M., & Nishiyama, S., 400  
Sutlic, A., 432  
  
Tangay, V., 385  
Tchasovnikov, N. See Milozorov, E. P.,  
*jt* author, 377  
Thorshaug, N., 375  
Turner, Helen N., 411  
  
Umeno, S., 362  
—, & Nobata, R., 364  
United States of America, Michigan, 411  
Urban, A. See Brocq-Rousseu, D., *jt*  
author, 362  
Urbanyi, L. See Marek, J., et al., *jt*  
authors, 419  
  
Vaisman, A. See Levaditu, C., *jt* author,  
423, *bis*  
Valade, P., 412  
Vallé, A. L., Braga, A., & Wey, A., 376  
Varicak, T. D., 432  
Velu, H., & Zottner, G., 376  
Versilova, P., & Striter, V., 375  
Vmatzer, J., 382  
Voronoff, S., 443  
  
Ward, A. H., 362  
Ward, S. M. See Rivers, T. M., et al., *jt*  
authors, 391

## *Index.*

- Watzka, M., 431.  
 Webb, J. L., 429.  
 Webb, P. See Muende, I., jt. author, 379.  
 Weinberg, M., Forgeot, P., & Meric, A., 368.  
 Weirether, F. J. See White, G. C., et al., jt. authors, 361.  
 Weisner, E. S., 407.  
 Wellman, O. See Marek, J., et al., jt. authors, 419.  
 Wetzel, R., & Emigk, K., 398, *ter.*  
 Wey, A. See Valle, A. L., et al., jt. authors, 376.  
 Whitby, L., 421.  
 White, E. G., 412.  
 White, G. C., Couture, G. W., Anderson, E. O., Johnson, R. E., Plastringe, W. N., & Weirether, F. J., 361.  
 Whitworth, S. H., 440.  
 Wiemann, 388.  
 Williams, J. See Gildow, E. M., et al., jt. authors, 413.  
 Wilson, J. E. See Morgan, D. O., jt. author, 397.  
 Witte, J. See Zwick, W., et al., jt. authors, 380.  
 Wolf, J., 388.  
 Wolters, K. L., & Dehmel, H., 403.  
 Wood, F. W. See Boynton, W. H., et al., jt. authors, 390.  
 Woods, Gladys M. See Boynton, W. H., et al., jt. authors, 390.  
 Yates, C. C. See Peren, G. S., et al., jt. authors, 406.  
 Zironi, A., 364.  
 Zottner, G. See Velu, H., jt. author, 376.  
 Zwick, W., Witte, J., & Schwarzmaier, E., 380.

## *Erratum.*

V. B. 9. 305 l. 45 for inoculation read incubation.

## INDEX VETERINARIUS.

*See notice on page 4 of cover.*

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:— Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI... ..	445-460	DISEASES, GENERAL :	
Streptococcal infection ... ..	445	[General diseases not dealt with under other headings : Organic Diseases, Miscellaneous Diseases, and Neoplasms] ...	481-491
Anthrax ... ..	447		
Tuberculosis ... ..	449		
Swine erysipelas ... ..	452		
Brucellosis ... ..	453		
Anaerobic infection ... ..	458		
Rhinoporiidiosis ... ..	460		
		NUTRITION IN RELATION TO DISEASE :	
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	461-465	[Articles placed in the section "Diseases, General" may also contain references to nutritional factors] ... ..	491-498
Trypanosomiasis ... ..	461	Mineral deficiency ... ..	491
Leptospirosis... ..	461	Vitamin deficiency ... ..	494
Coccidiosis ... ..	462		
Piroplasmosis... ..	464		
Various ... ..	465		
DISEASES CAUSED BY VIRUSES ... ..	466-474	THERAPEUTICS ... ..	498-500
Foot and mouth disease ... ..	466		
Swine fever ... ..	469	POISONS AND POISONING... ..	500-501
Equine infectious anaemia ... ..	469		
Pox ... ..	471		
Fox distemper ... ..	471	PHYSIOLOGY ... ..	501-502
Rabies... ..	472		
Influenza ... ..	472		
		TECHNIQUE AND APPARATUS ... ..	502-503
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ... ..	474-476		
		MISCELLANEOUS ... ..	503-504
PARASITES IN RELATION TO DISEASE [HELMINTHS]... ..	476-479		
Trematodes ... ..	476	REPORTS ... ..	504-511
Cestodes ... ..	477	New Zealand ... ..	504
Nematodes ... ..	478	Gold Coast ... ..	507
		Holland ... ..	509
IMMUNITY [including Allergic and Serological Diagnosis] ... ..	479-481	BOOK REVIEWS ... ..	511-514

# INDEX TO AUTHORS

- Abell, R. G., & Schenck, H. P., 481.  
 Agghsa, M., 460.  
 Almqvist, H. J. See Leprovsky, S., et al.,  
 jt. authors, 495.  
 Amer. Rev. Tuberc., 449.  
 American Type Culture Collection, Catalogue, 503.  
 Andersen, Elae K. See Orskov, J., jt  
 author, 471.  
 Argun, T., & Oektem, Z., 461.  
 Ariel, M., 455, *bs*  
 Askew, H. O., 493.  
 Babic, I., 481.  
 Bacigalupo, G., & Franzani, O. F., 478  
 Baggenstoss, A. H. See Feldman, W. H.,  
 jt. author, 449  
 Bailly, J. See Remlinger, P., jt. author,  
 472.  
 Bakos, M., 460  
 Balozet, L., 470  
 Barrairon, E., 405.  
 Barry, W. C., 504  
 Baumgartner, A., 478.  
 Beauvallet, M., 495.  
 de Benedetti, M., 446  
 Berger, H. C. L. E., 509.  
 Biester, H. F. See Eveleth, D. F., jt  
 author, 491.  
 Bischoff, O., 454  
 Bonezzi, G. See Sartori, C., jt. author,  
 461  
 Bonner, W. G., 501  
 von Bormann, F., 447  
 Boughton, D. C., Boughton, Ruth B., &  
 Volk, J., 463.  
 —, & Volk, J. J., 463.  
 Boughton, Ruth B. See Boughton, D. C.,  
 et al., jt. authors, 463  
 Bramm, G. A., 452.  
 Brion, A., 489  
 British Empire Cancer Campaign, Rep.  
 Yorkshire Council, 504  
 Buchholz, G., 451.  
 Bürgi, O., 483.  
 Bull. Off. internat. Epiz., 472.  
 Bumüller, E., 469  
 Burrä, J., 500.  
 Butz, H., 482.  
 Cairns, D., 501.  
 Campion, J. See Foot, A. S., et al., jt.  
 authors, 494.  
 Garcia, J. A. R., 448.  
 Cardona, L., 464.  
 Carlier, F., 475.  
 Carpano, M., 487  
 Carra, L., 501  
 Carroll, A. N., 453.  
 Casanova, & Peloso, M. T., 457  
 Catherine, A., 482.  
 Chambers, F., 454.  
 Champy, C., & Lavedan, J. P., 490  
 Charnoy, R., 449  
 Chaton, M., 477.  
 Cirenci, G., 487.  
 Claude, A., 474  
 Coale, R. B. See Wicktor, C. E., jt. author,  
 468  
 Coburn, D. R., & Quortrup, E. R., 459  
 Collier, W. A. See Esseveld, H., jt. author,  
 462, *bs*.  
 Colosini, P., 479.  
 Condrea, P., Poenaru, Hélène, & Dima, G.,  
 480.  
 Conti, G., 465  
 da Costa, S. F. G. See Ettisch, G., jt  
 author, 499.  
 Cramer, W., 488.  
 Cunningham, I. J., & Cunningham, Marion  
 M., 493.  
 Cunningham, Marion M. See Cunning-  
 ham, I. J., jt. author, 493.  
 Dalrymple-Champneys, W., 456.  
 Das-Gupta, M., 463.  
 Datta, S. C. A., 485.  
 Davy, P. E., & Levaditi, J. C., 451.  
 Deppe, K., 501  
 Delelsen, 500  
 Dima, G. See Condrea, P., et al., jt  
 authors, 480  
 Djaenoedin, R. See Kraneveld, F. C., jt.  
 author, 447.  
 Doerr, R., & Hallauer, C., 512.  
 Douglas, J. R., 479.  
 Drinker, C. K. See Yoffey, J. M., et al., jt.  
 authors, 502.  
 Dukes, C. E., 502.  
 Dunlap, G. L. See Levine, N. D., et al., jt.  
 authors, 465  
 Dunlop, G., & Wells, H. E., 492  
 Edin, H., 467.  
 Ehrlich See Karsten, jt. author, 454  
 Ellis, C. C., 463  
 Embao, P., 477.  
 Engelbreth-Holm, J., & Frederiksen, O.,  
 489, *bs*  
 Esseveld, H., & Collier, W. A., 462, *bs*  
 Ettisch, G., & da Costa, S. F. G., 499  
 Eveleth, D. F., & Biester, H. E., 491  
 Faré, C., 514.  
 Feldman, W. H., & Baggenstoss, A. H., 449  
 Filippi, Angèle. See Roche, J., et al., jt  
 authors, 502.  
 Fitzpatrick, F. See Zinsser, H., et al., jt  
 authors, 473.  
 Flaum, A., 447  
 Florentin, D., 497.  
 Foot, A. S., Golding, J., Kon, S. K.,  
 Campon, J., Henry, K. M., &  
 Huthnane, S. L., 494  
 Forbes, E. B., & Johnson, S. R., 493.  
 Forsell, G., 467.  
 Forster, H., 490.  
 Fox, J. P. See Robertson, O. H., jt. author,  
 484.  
 Francis, T., Jr., 472, *bs*  
 —, & Stuart-Harris, C. H., 472, *bs*  
 — See also Stuart-Harris, C. H., jt. author  
 472  
 Franzani, O. F. See Bacigalupo, G., jt.  
 author, 478  
 Fraser, A. C., 488  
 Frederiksen, O. See Engelbreth-Holm,  
 J., jt. author, 489, *bs*.  
 Fästhy, O., 466.  
 von Gajewski, S. R., 489  
 Garcia, E. Y. See Refuerzo, P. G., jt.  
 author, 478  
 Gerlach, F., 472, 509.  
 Gildow, E. M. See Williams, J. K., et al.,  
 jt. authors, 489.  
 Girard, H., 468  
 Guliani, V., 457  
 Godden, W. See Snook, L. C., jt. author,  
 494.  
 Goerttler, 497.  
 Golding, J. See Foot, A. S., et al., jt.  
 authors, 494.  
 Graham, R. See Levine, N. D., et al., jt.  
 authors, 465.  
 Gray, A. A., 512.  
 Grummett, R. E. R., 506.  
 Grunpret, J., 471.  
 Gröb, E., 450.  
 Grossman, J. D., 513.  
 Groulade, P., 499.  
 Guenther, D. F., 486.  
 Guggenheim, K. See Kligler, I. J., et al.,  
 jt. authors, 459.  
 Guillou, J., 487.  
 Gunderson, M. F. See Lemar, J. D., jt.  
 author, 446.  
 Habs, H., 447.  
 Hallauer, C. See Doerr, R., jt. author, 512.  
 Hallman, E. T. See Moore, L. A., et al.,  
 jt. authors, 493.  
 Harms, F. See Miessner, H., et al., jt.  
 authors, 507.  
 Hegner, R., & Wolfson, F., 468.  
 Hellenes, P., 471.  
 Henry, K. M. See Foot, A. S., et al., jt  
 authors, 494.  
 Hiroki, H., 450.  
 Holland, Rep. Live-Stk. Hlth Serv.,  
 Friesland, 510.  
 —, Rep. Rijkse Serum Inst., 510.  
 —, Rep. vet. Serv., 509.  
 Hopkirk, C. S. M., 505  
 Hülpers, G., & Lagerlöf, N., 474.  
 Hughes, E. H., 494  
 Hupbauer, A., & Skokovic, L., 469.  
 Huthnane, S. L. See Foot, A. S., et al., jt  
 authors, 494.  
 Iyer, K. S. G. See Mudaliar, S. V., jt.  
 author, 477  
 Iyer, P. R. K., 479.  
 Jezic, J., 460.  
 Johnson, S. R. See Forbes, E. B., jt.  
 author, 493.  
 Jobs, Ilona, 456.  
 Jourdonais, L. F. See Nungester, W. J.,  
 jt. author, 483  
 J. Amer. vet. med. Ass., 474  
 Jukes, T. H. See Leprovsky, S., et al.,  
 jt. authors, 495.  
 Karsten, & Ehrlich, 454  
 Kauffmann, F. See Orskov, J., jt. author,  
 480.  
 Kelsner, R. A., 511.  
 Kessens, B. H., 452.  
 Kligler, I. J., Guggenheim, K., & Warburg,  
 F. M., 459.  
 Klimmer, M., 458  
 Kon, S. K., & Maddock, C., 450  
 —. See also Foot, A. S., et al., jt. authors,  
 494  
 Kraneveld, F. C., & Djaenoedin, R., 447  
 Labelle, G., 498.  
 Lagerlöf, N. See Hülpers, G., jt. author,  
 474  
 Laland, P. See Nicolaysen, R., jt. author,  
 495.  
 Lampman, C. E. See Williams, J. K., et al.,  
 jt. authors, 489.  
 Lancet, 498  
 Lavedan, J. P. See Champy, C., jt. author,  
 490  
 Lefanu, W. R., 503.  
 Lemar, J. D., & Gunderson, M. F., 446.  
 Leprovsky, S., Taylor, L. W., Jukes, T. H.,  
 & Almqvist, H. J., 495.  
 Levaditi, J. C. See Davy, P. E., jt. author,  
 451.  
 Levine, N. D., Dunlap, G. L., & Graham,  
 R., 465.  
 Levine, P. P., 462.  
 Lima, C. See Souto, A. B., jt. author, 459,  
 ter.  
 Lockemann, G., 460.  
 Lombardi, L., 466.  
 Lourens, L. F. D. E., 510.  
 Lührs, E., 454.  
 McClung, L. S. See McCoy, Elizabeth, jt.  
 author, 513.  
 McCoy, Elizabeth, & McClung, L. S., 513.  
 McEwen, A. D., & Priestley, F. W., 454.  
 M'Fadyean, J., 483.  
 MacLeod, J., 475.  
 Macrae, D. R., 498.  
 Maddock, C. See Kon, S. K., jt. author,  
 450.  
 Magnusson, H., 467.

# Index.

- Manadsl. skand. Kreaturoldisakringsbol., 467, *bx*.  
 Manseau, A., 466.  
 Marcato, A., 453.  
 Marienburg, H., 454.  
 Marsh, H., 483.  
 Martinez Langan, E., 497.  
 Masbeter, J. W. H., 458.  
 Mensa, A., 490.  
 Menzies, D. W., 481.  
 Mertens, W. K., 461.  
 Mészáros, I., 445.  
 Messner, H., Schoop, G., & Harms, F., 507.  
 Miller, W. C., 491.  
 Minster, R. D., 480.  
 Mönkemeier, A., 469.  
 Moore, L. A., Hallman, E. T., & Sholl, L. B., 493.  
 Morgue, M. See Roche, J., et al., *jt*, authors, 502.  
 Morrison, A. E., 478.  
 de Moulin, F., 452.  
 Mudaliar, S. V., & Iyer, K. S. G., 477.  
 Naik, R. N., 448.  
 Narbutas, J., 497.  
 N. Z. J. Agric., 488.  
 Nicolayson, R., & Laland, P., 495.  
 Nikolić, N., 450.  
 Nobrega, P. See Reis, J., *jt*, author, 471.  
 Nordlund, Ingrid, 453.  
 Nungester, W. J., & Jourdonais, L. F., 483.  
 Oektem, Z. See Argun, T., *jt*, author, 461.  
 Onano, F. See Spanedda, A., *jt*, author, 446.  
 Orskov, J., & Andersen, Else K., 471.  
 —, & Kauffmann, F., 480.  
 Packhaman, A., 161.  
 Pagnini, U., 447.  
 Palmer, C. C., 487.  
 Parnes, J., 490.  
 Passey, R. D., 488.  
 Peloso, M. T. See Casanova, F., *jt*, author, 457.  
 Penso, G., 446.  
 Peters, T., 469.  
 Philipson, J., 480.  
 Piening, C., 467.  
 Poenaru, Hélène. See Condrea, P., et al., *jt*, authors, 480.  
 Pommeret, M., 486.  
 Posgay, F., 498.  
 Pratt, L., 462.  
 Presser, H., 470.  
 Priestley, F. W. See McEwen, A. D., *jt*, author, 454.  
 Przegl. wet., 468.  
 Quortrup, E. R. See Coburn, D. R., *jt*, author, 459.  
 Radvilya, P., 452.  
 Rao, M. A. N., 460.  
 Receveur, A. E. F., 461.  
 Reeser, H. E., 481.  
 Refuerzo, P. G., & Garcia, E. Y., 478.  
 Reis, J., & Nobrega, P., 471.  
 Remlinger, P., & Bailly, J., 472.  
 Rep. Dep. Agne, N. Z., 1937-38, 504, 505, 506.  
 Rep. Kans agric. Exp. Sta., 464.  
 Rey, C., 466.  
 Rezzani, F. D., 496.  
 Rinyard, P., 466.  
 Robertson, O. H., 483.  
 —, & Fox, J. P., 484.  
 Robinson, L. E., 475.  
 Roche, J., Filippi, Angèle, & Morgue, M., 502.  
 Rosa, A., 450.  
 Rossi, P., 458.  
 Rossagnol, L., 466.  
 Sahai, L., 460.  
 Sandholm, A., 454.  
 Sarnowicz, W., 458.  
 Sartori, C., & Bonezzi, G., 451.  
 Sauné, M., 464.  
 Schenck, H. P. See Abell, R. G., *jt*, author, 481.  
 Schmaltz, R., 513.  
 Schoop, G. See Miessner, H., et al., *jt*, authors, 507.  
 Scorgie, N. J., 498.  
 Seckles, L., 494.  
 Seidlin, G., 450.  
 Severgnini, A., 489.  
 Sholl, L. B. See Moore, L. A., et al., *jt*, authors, 493.  
 Sievert, Lena, 458.  
 Simmons, S. W., 474.  
 Simonelli, A., 451.  
 Simons, H., 503.  
 Sisson, S., 513.  
 Skokovic, L. See Hupbauer, A., *jt*, author, 469.  
 Skryabin, K. I., & Šulc, R. E. S., 476.  
 Snook, L. C., & Godden, W., 494.  
 Souto, A. B., & Lima, C., 450, *ter*.  
 Spanedda, A., & Onano, F., 446.  
 Srivastava, H. D., 476, 477.  
 Stableforth, A. W., 445.  
 Stamatin, N., 471.  
 Stewart, J. L., 507.  
 Stone, W. S., 455.  
 Stuart-Harris, C. H., & Francis, T., Jr., 472.  
 —. See also Francis, T., Jr., *jt*, author, 472, *bx*.  
 Šulc, R. E. S. See Skryabin, K. I., *jt*, author, 476.  
 Sullivan, E. R. See Yoffey, J. M., et al., *jt*, authors, 502.  
 Swanberg, O., 492.  
 Szablowski, J., 500, *bx*.  
 Taylor, E. L., 478.  
 Taylor, L. W. See Leprovsky, S., et al., *jt*, authors, 495.  
 Thijn, J. W., 449.  
 Thoonen, J., 496.  
 Travassos, L., Festschrift to, 514.  
 Tunis, E., 487.  
 Valcarenghi, F., 482.  
 Veenbaas, A. H., 510.  
 Verstraete, A., 496.  
 Vlach, G., 461.  
 Volk, J. See Boughton, D. C., et al., *jt*, authors, 163.  
 Volk, J. J. See Boughton, D. C., *jt*, author, 463.  
 Voncina, D., 469.  
 Warburg, F. M. See Kligler, I. J., et al., *jt*, authors, 459.  
 Wu, H. See Zinsser, H., et al., *jt*, authors, 473.  
 Wendenmüller, H., 448.  
 Wells, H. E. See Dunlop, G., *jt*, author, 492.  
 Wicktor, C. E., & Coale, B. B., 468.  
 Williams, J. K., Gildow, E. M., & Lampman, C. E., 489.  
 Witte, J., 467.  
 Wolfson, F. See Hegner, R., *jt*, author, 463.  
 Yoffey, J. M., Sullivan, E. R., & Drinker, C. K., 502.  
 Yutuc, L. M., 476.  
 Zinsser, H., Wei, H., & Fitzpatrick, F., 473.  
 Zorzi, G. B., 457.

## INDEX VETERINARIUS.

See notice on page 4 of cover.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

#### **Books for Review.**

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under :- Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity] ...	515-529	DISEASES, GENERAL :	
Streptococcal infection ...	515	[General diseases not dealt with under other headings : Organic Diseases, Miscellaneous Diseases and Neoplasms] ...	561-573
Anthrax ... ..	517		
Tuberculosis ... ..	518	NUTRITION IN RELATION TO DISEASE :	
Corynebacterium infection... ..	521	[Articles placed in the section " Diseases General " may also contain references to nutritional factors] ...	573-579
Swine erysipelas ... ..	522	Mineral deficiency ... ..	573
Brucellosis ... ..	524	Vitamin deficiency ... ..	575
Anaerobic infection ... ..	527		
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	529-535	PUBLIC HEALTH ... ..	579-581
Trypanosomiasis ... ..	531	Milk hygiene... ..	579
Coccidiosis ... ..	533	Meat hygiene ... ..	580
Piroplasmosis... ..	533		
Spirochaetosis ... ..	534	THERAPEUTICS ... ..	581-582
DISEASES CAUSED BY VIRUSES ...	535-545	PHYSIOLOGY ... ..	582-585
Foot and mouth disease ... ..	535		
Rinderpest ... ..	536	TECHNIQUE AND APPARATUS ...	585-587
Contagious bovine pleuro-pneumonia ... ..	538	MISCELLANEOUS ... ..	588-590
Equine encephalomyelitis ... ..	539	REPORTS ... ..	590-597
Pox ... ..	541	Tanganyika Territory ... ..	590
Rabies... ..	542	Palestine ... ..	592
Various ... ..	542	Austria ... ..	593
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ... ..	545-547	Norway ... ..	593
PARASITES IN RELATION TO DISEASE [HELMINTHS] [see also Immunity] ... ..	547-552	Yugoslavia ... ..	596
Trematodes ... ..	548	French West Africa... ..	596
Cestodes ... ..	548		
Nematodes ... ..	550	BOOK REVIEWS ... ..	597-598
IMMUNITY [including Allergic and Serological Diagnosis] ...	553-560		
Tuberculin ... ..	553		
Serological diagnosis ... ..	554		
Various ... ..	557		

# INDEX TO AUTHORS

- Abderhalden, E., 577.  
 —, & Abderhalden, R., 577, *bis*.  
 Abderhalden, R. See Abderhalden, E., *jt.*  
 author, 577, *bis*.  
 Ackert, J. E., & Reid, W. M., 548.  
 Adler, S., & Ellenbogen, V., 534.  
 Augustine, D. L. See Hegner, R., et al., *jt.*  
 authors, 597.  
 di Aichelburg, U., 556.  
 von Albertini, A., & Grumbach, A., 515.  
 Alessandrini, A., & Dominici, D., 526.  
 Andrews, J., & von Brand, T., 531.  
 —, & Miller, F. W., 531.  
 Austria, Rep. Mödling Inst., 1937, 593.  
 Bailly, J. See Remlinger, P., *jt.* author,  
 542, 548.  
 Balozet, L., 541, 542.  
 Barboni, E., 524.  
 Bardach. See Brédre, et al., *jt.* authors,  
 536.  
 Bardswell, N. D., 519.  
 Barger, J. A. See McNutt, S. H., et al., *jt.*  
 authors, 532.  
 Barrie, Mary M. O., 578.  
 Bauer, 590.  
 Beard, J. W. See Finkelstein, H., et al., *jt.*  
 authors, 539.  
 Behnke, J., 555.  
 Bennetts, H. W., & Hall, H. T. B., 527.  
 Berliner, V., & Warbritten, Virgenc, 584.  
 Bertolino, P. See Rosati, T., *jt.* author,  
 522.  
 Best, C. H. See Thalhumer, W., et al., *jt.*  
 authors, 583.  
 Bethke, R. M. See Krauss, W. E., *jt.*  
 author, 578.  
 Bindel, L., 568.  
 Binns, H. R., 530.  
 Biocca, E., 527.  
 Bishop, Lucille M. See Fitch, C. P., et al.,  
*jt.* authors, 525.  
 Bittrarelli, R., 522.  
 Blohm, F. See McNutt, S. H., et al., *jt.*  
 authors, 532.  
 Bly, H. See Farquharson, J., *jt.* author,  
 547.  
 Bonnet, H., Thieffry, S., & Montefiore, 520.  
 Boquet, A., 519, 520.  
 Boyd, W., 597.  
 Boyd, W. L. See Fitch, C. P., et al., *jt.*  
 authors, 525.  
 Bozzelli, R., 531.  
 Brady, D. E. See Comstock, R. E., *jt.*  
 author, 584.  
 Braga, A., 543.  
 von Brand, T. See Andrews, J., *jt.* author,  
 531.  
 Brandt, A. J., 517.  
 Brandt, H., 523.  
 Bridgits, W. H. See Finkelstein, H., et al.,  
*jt.* authors, 539.  
 Brédre, Bardach, & Joltrain, 536.  
 Brit med J., 587.  
 Brocq-Rousseau, D., & Roussel, G., 598.  
 Brown, A. A. F., 529.  
 Brown, H. E. See Derrick, E. H., et al.,  
*jt.* authors, 544.  
 Buck, G. See Girard, G., et al., *jt.* authors,  
 564.  
 Bull. Hlth Org. L. o. N., 524.  
 Bull. Serv. zootech. Epiz. A. O. F., 596.  
 Burnet, F. M., 544.  
 Butler, E. J., 528.  
 de Camels, F., 530.  
 Cameron, D., 547.  
 Cameron, T. W. M., 552.  
 Campbell, A. D., 534, *ter*.  
 Cannon, D. G., 548.  
 Carpano, M., 535.  
 Case, C. H., & Keefer, W. O., 532.  
 Chelle, P. L. See Cuille, J., *jt.* author, 570.  
 Chew, A. P., 589.  
 Ciurea, V. See Mihailescu, M., *jt.* author,  
 528.  
 Clay, A. L., 551.  
 Clin. vet., Milano, 531.  
 Coca, A. F., 566.  
 Cockayne, A. H., 588.  
 Comstock, R. E., & Brady, D. E., 584.  
 Cornell, R. L., 522.  
 Corper, H. J., 586.  
 Corwin, L. A., & Desson, L. J., 566.  
 Coulaud, E., 558.  
 Cox, H. R., Philip, C. B., Marsh, H., &  
 Kilpatrick, J. W., 540.  
 Crocker, C. G. See Pyper, A., *jt.* author,  
 544.  
 Cuille, J., & Chelle, P. L., 570.  
 Culbertson, J. T., & Kaplan, S. S., 522, *bis*.  
 —. See also Zwemer, R. L., *jt.* author, 531.  
 Curasson, G., 598.  
 Czelný, K., 528, 549.  
 Dalling, T., 561.  
 Danchus, G., & Löfstedt, F., 546.  
 Davis, D. J., 572.  
 Davis, H. J., Norris, L. C., & Heuser, G. F.,  
 585, *bis*.  
 Dayus, C. V., 541.  
 Delaplane, J. P., Erwin, L. E., & Stuart,  
 H. O., 523.  
 Delpy, L., & Kaweh, M., 518.  
 Derrick, E. H., Johnson, D. W., Smith,  
 D. J. W., & Brown, H. E., 544.  
 Desson, L. J. See Corwin, L. A., *jt.* author,  
 566.  
 Dessy, G., 520.  
 Dickinson, E. M. See Rosenwald, A. S.,  
*jt.* author, 522.  
 Diernhofer, K., 526, 555.  
 Diensperov, A. G. See Polovceva, V. V.,  
 et al., *jt.* authors, 567.  
 Dieter, K., 571.  
 Dikmans, A., & Poelma, L. J., 532.  
 Dolb, M. J. L., Jansen, B. C. P., Sizoo,  
 G. J., & van der Maas, G. J., 574.  
 Dominici, D. See Alessandrini, A., *jt.*  
 author, 526.  
 Dorman, S. C., Hale, W. C., & Hoskins,  
 W. M., 545.  
 Drimmelen, G. C., 517.  
 Ecker, E. E., 559.  
 Echhorn, A., & Wyckoff, R. W. G., 540.  
 Ellenbogen, V. See Adler, S., *jt.* author,  
 534.  
 Eriksson, K., 566.  
 Erwin, L. E. See Delaplane, J. P., et al.,  
*jt.* authors, 523.  
 Evans, S. A., 525, 548, 553, 591.  
 Farnas, E. C., 589.  
 Farquharson, J., & Bly, H., 547.  
 Fedotov, A. I., 583.  
 Ferguast, R. R., 580.  
 Finkelstein, H., Marx, W., Bridgers,  
 W. H., & Beard, J. W., 539.  
 Finzi, G., 553.  
 Fitch, C. P., Bishop, Lucille M., & Boyd,  
 W. L., 525.  
 Foerster, W., 524.  
 Fraser, A. H. H., Thomson, W., Robertson,  
 D., & George, W., 550.  
 Freund, J., & Opie, E. L., 558.  
 Fritzsche, K., 572, *bis*.  
 Fröhle, O., 555.  
 Fry, R. M. See Hare, T., *jt.* author, 515.  
 Fukusho, K. See Nakamura, J., et al., *jt.*  
 authors, 536.  
 Gallup, W. D., & Norris, L. C., 574, *bis*.  
 Galvao, P. E., 577.  
 Garlick, G. G., 532.  
 Gaus, O., 583.  
 George, W. See Fraser, A. H. H., et al., *jt.*  
 authors, 550.  
 Gillan, J. See Rodhain, J., *jt.* author, 552.  
 Girard, G., Robic, J., & Buck, G., 564.  
 Glover, R. E., 519.  
 Goreczky, L. See Gratia, A., *jt.* author,  
 558.  
 Gräub, E., & Zachokke, W., 527.  
 Gratecos. See Marotel, *jt.* author, 548.  
 Gratia, A., & Goreczky, L., 558.  
 Green, R. G., & Larson, C. L., 571.  
 Gregoire, C., 577.  
 Grimpret, G., 543, 564.  
 Gros, H. See Joyeux, C., et al., *jt.* authors,  
 549.  
 Grumbach, A. See von Albertini, A., *jt.*  
 author, 515.  
 Grycz, E., & Kaszkiewicz, T., 522.  
 Grzycki, St., & Guca, W., 569.  
 Guca, W. See Grzycki, St., *jt.* author, 569.  
 Guilbert, H. R., & Hart, G. H., 575.  
 —, Miller, R. F., & Hughes, E. H., 575.  
 Hantach, L., 554.  
 Hale, W. C. See Dorman, S. C., et al., *jt.*  
 authors, 545.  
 Hall, H. T. B. See Bennetts, H. W., *jt.*  
 author, 527.  
 Hammersland, H. L., Herrin, H. S., &  
 Haynes, C. F., 541.  
 Hare, T., & Fry, R. M., 515.  
 Hart, G. H. See Guilbert, H. R., *jt.* author,  
 575.  
 Hart, L. See Hungerford, T. G., *jt.* author,  
 535.  
 Haynes, C. F. See Hammersland, H. L.,  
 et al., *jt.* authors, 541.  
 Hegner, R., Root, F. M., Augustine, D. L.,  
 & Huff, C. G., 597.  
 Heidelberg, C., & Kendall, F. E., 557.  
 le Hénaff, N., 578.  
 Henneberg, O. H., 580.  
 Henschen, F., 565.  
 von Hepding, L., 564.  
 Herrin, H. S. See Hammersland, H. L.,  
 et al., *jt.* authors, 541.  
 Hetzer, H. O., 524.  
 Heuser, G. F. See Davis, H. J., et al., *jt.*  
 authors, 585, *bis*.  
 Hoffmann, F. See Koves, J., *jt.* author,  
 559.  
 Hofmann, F., 590.  
 Hopkirk, C. S. M., 561.  
 Hornby, H. E., 529, 581, 590.  
 Horsfall, Margery W., & Jones, Myrna F.,  
 548.  
 Hoskins, W. M. See Dorman, S. C., et al.,  
*jt.* authors, 545.  
 Howitt, Beatrice F., 539.  
 Huff, C. G. See Hegner, R., et al., *jt.*  
 authors, 597.  
 Hughes, E. H. See Guilbert, H. R., et al.,  
*jt.* authors, 575.  
 Hughes, T. P. See Scheip, H. W., *jt.*  
 author, 586.  
 Hungerford, T. G., & Hart, L., 535.  
 Hupbauer, A., 588, 596.  
 —, & Lugomer, V., 541.  
 Irving, J. T., & Richards, Marion B., 575.  
 Jacobsen, E. See Petersen, C. B., *jt.* author,  
 535, *bis*.  
 Jacquet, J., 560, *bis*.  
 Jansen, B. C. P. See Dols, M. J. L., et al.,  
*jt.* authors, 574.  
 Janssens, P. G., 530.  
 Johnson, D. W. See Derrick, E. H., et al.,  
*jt.* authors, 544.  
 Joltrain. See Bardach, et al., *jt.* authors,  
 536.  
 Jones, Myrna F. See Horsfall, Margery W.,  
*jt.* author, 548.  
 J. Dep. Agric. Viet., 535.  
 Joyeux, C., Senévet, G., & Gros, H., 549.

# Index.

- Joyner, A. L. See Sabin, F. R., et al., jt. authors, 521.  
 Judovic, S. S. See Polovceva, V. V., et al., jt. authors, 567.  
 Juge, 538.  
 Julien, J., 525.  
 Jungherr, E., & Landauer, W., 572.  
 Kaplan, S. S. See Culbertson, J. T., jt. author, 552, *bis*.  
 Kathe, 580.  
 Kaweh, M. See Delpy, L., jt. author, 518.  
 Keefer, W. O. See Case, C. H., jt. author, 532.  
 Kemp, T., 566.  
 Kendall, F. E. See Heidelberger, M., jt. author, 557.  
 Kerr, K. B., 551.  
 Kilpatrick, J. W. See Cox, H. R., et al., jt. authors, 540.  
 Klimneck, 580.  
 Koch, J., 586.  
 de Kock, G., 564.  
 Koves, J., & Hoffmann, F., 559.  
 Koschucharoff, P., 518.  
 Krauss, W. E., & Bethke, R. M., 574.  
 Kreguer, A. See Weinberg, M., jt. author, 558.  
 Kro6, H., & Orbanaja, J. G., 534, *bis*.  
 Ksiakiewicz, T. See Grycz, E., jt. author, 522.  
 Kulczycki, L., 536.  
 Kunert, H., 536.  
 Kuwabara, T., 519.  
 Kwiatkowska, Anela, & Moscicki, Marian, 552.  
 Labatut, R. See Lasserre, R., et al., jt. authors, 571.  
 Labranca, G., 527.  
 Lambert, R. K., 533.  
 Landauer, W., 565.  
 —. See also Jungherr, E., jt. author, 572.  
 Lange, L., & Pescatore, H., 521.  
 Larson, C. L. See Green, R. G., jt. author, 571.  
 Lasserre, R., Lombard, C., & Labatut, R., 571.  
 Linon, G., 589.  
 Lister, S., 592, *bis*.  
 Locke, R. C., 579.  
 Lofstedt, F. See Danchus, G., jt. author, 546.  
 Lombard, C. See Lasserre, R., et al., jt. authors, 571.  
 Lopes de Aboim Inglez, A., 518.  
 Lopes, H. de S., 545.  
 Lopyun, A. I. See Polovceva, V. V., et al., jt. authors, 567.  
 Love, E. L., 555.  
 Lowe, H. J., 688, 591.  
 Lugomer, V. See Hupbauer, A., jt. author, 541.  
 Lukaszak, J., 547.  
 van der Maas, G. J. See Dols, M. J. L., et al., jt. authors, 574.  
 McCallum, Jennie W. See Stewart, J., jt. author, 575.  
 Macchioni, L., 570.  
 McCowan, J. P., 574.  
 Macindoe, R. H. F., 547.  
 McNaught, K. J., 587.  
 McNutt, S. H., Blohm, F., & Barger, J. A., 532.  
 —, & Wall, J. F., 575.  
 Marotel, & Gratecos, 548.  
 Marsh, H. See Cox, H. R., et al., jt. authors, 540.  
 Marx, W. See Finkelstein, H., et al., jt. authors, 539.  
 Medlock, F. W., 579.  
 Merzdorf, G., 582.  
 Meyer, J. R., 581.  
 Miègeville, J., 569.  
 Miessner, H., 568.  
 Mihailescu, M., & Ciurea, V., 528.  
 Milks, H. J., 566.  
 Miller, F. W. See Andrews, J., jt. author, 531.  
 Miller, R. F. See Guilbert, H. R., et al., jt. authors, 575.  
 di Mino, G. See Rosati, T., jt. author, 527.  
 Moguel, F., 589.  
 Mollin, F. E., 562.  
 Montefiore. See Bonnet, H., et al., jt. authors, 520.  
 Moore, L. A., 575.  
 Morton, H. E., & Pulaski, E. J., 585.  
 Morton, R. A., 585.  
 Mosciak, Marian. See Kwiatkowska, Anela, jt. author, 552.  
 de Moulin, F., & Soemanegara, R. M., 517.  
 Mueller, J. F., 550.  
 Murciani, C., 571.  
 Naik, R. N., 537.  
 Nakamura, J., Wagatsuma, S., & Fukusho, K., 536.  
 Nash, T. A. M., 546.  
 Negri, R., 553.  
 Nieschulz, O., 534.  
 de Nitor, G., 584.  
 Norris, L. C. See Davis, H. J., et al., jt. authors, 585, *bis*.  
 —. See also Gallup, W. D., jt. author, 574, *bis*.  
 Norsk VetTidskr., 525.  
 Norway, Rep. Civil vet. Serv., 1933, 593.  
 —, Rep. Civil vet. Serv., 1934, 594.  
 —, Rep. Civil vet. Serv., 1935, 594.  
 —, Rep. Civil vet. Serv., 1936, 595.  
 Obitz, K., 545.  
 Opie, E. L. See Freund, J., jt. author, 558.  
 Oppermann, T., 568.  
 Orbanaja, J. G. See Kro6, H., jt. author, 534, *bis*.  
 Palestine, Rep. Govt. vet. Serv., 1938, 592.  
 Panusset, L., 561.  
 Parnell, I. W., 551.  
 Parnes, J., 569.  
 Pasqua, A., 570.  
 Patterson, J. B. E., 573.  
 Peck, E. F., 563.  
 Pedersen, K. O. See Seibert, Florence B., et al., jt. authors, 551.  
 Pennacchi, L., 541.  
 Perdragal, I., & Scuti, R., 560.  
 Perdrau, J. R., 544.  
 Pescatore, H. See Lange, L., jt. author, 521.  
 Petersen, C. B., & Jacobsen, E., 535, *bis*.  
 Petrov, A. M., 582.  
 Petterson, B., 546.  
 Philip, C. B. See Cox, H. R., et al., jt. authors, 540.  
 Phipper, A., & Crocker, C. G., 544.  
 Pochon, J. See Prévot, A. R., jt. author, 554.  
 Poelma, L. J. See Dikmans, A., jt. author, 532.  
 Pogonova, N. V. See Polovceva, V. V., et al., jt. authors, 567.  
 Pollock, R. C., 588.  
 Polovceva, V. V., Pogonova, N. V., Lopyrin, A. I., Judovic, S. S., & Diesperov, A. G., 567.  
 Prévot, A. R., & Pochon, J., 554.  
 Pistotkovic, S., 556.  
 Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm., 1932-1935, 578.  
 Pulaski, E. J. See Morton, H. E., jt. author, 585.  
 Quin, A. H., Jr., 533.  
 Rao, R. S., 542.  
 Rastegar, R., 523.  
 Ray, H. N., 533.  
 Rayski, C., 551.  
 Rec. Méd. vét., 518.  
 Reid, A. H., 521.  
 Reid, W. M. See Ackert, J. E., jt. author, 548.  
 Reihart, O. F., 582.  
 Reminger, P., 543.  
 —, & Bailly, J., 542, 543.  
 Rep. Dep. vet. Sci. Tanganyika, 1937, 591, *bis*.  
 Rev. Méd. vét., Toulouse, 590.  
 Rexroth, E., 587.  
 Richards, Marion B. See Irving, J. T., jt. author, 575.  
 Riedel, 580.  
 Rivera, E., 553.  
 Robertson, D. See Fraser, A. H. H., et al., jt. authors, 550.  
 Robic, J. See Girard, G., et al., jt. authors, 564.  
 Rodhain, J., & Gillan, J., 552.  
 Rogers, L., 562.  
 Rogom, A., 553.  
 Root, F. M. See Hegner, R., et al., jt. authors, 597.  
 Rosati, T., & Bertolino, P., 522.  
 —, & di Mino, G., 527.  
 Roswald, A. S., & Dickinson, F. M., 522.  
 Rossi, P., & Sauné, M. L., jt. author, 528.  
 Roussel, G. See Brocq-Rousseau, D., jt. author, 598.  
 le Roux, G., & Tran-Ngoc-Hoan, jt. author, 537.  
 Rudd, G. V. See Ward, H. K., jt. author, 516.  
 Rudolf, H., 555.  
 Runge, S., 584.  
 Sabin, F. R., Joyner, A. L., & Smithburn, K. C., 521.  
 Sabovljev, A., 582.  
 Saenz, A., 567, *bis*.  
 Saigues, R., 575.  
 Salomon, W., 586.  
 Salow, H., 554.  
 Sauné, M. I. See Rosati, P., jt. author, 528.  
 Savickis, J., 552.  
 Scherp, H. W., & Hughes, T. P., 586.  
 Schulz, F. N., 598.  
 Scuti, R. See Perdragal, I., jt. author, 560.  
 Seddon, H. R., 539.  
 Seibert, Florence B., Pedersen, K. O., & Tiselius, A., 554.  
 Sen, K. C., & Seshan, P. A., 575.  
 Senevet, G. See Joyeux, C., et al., jt. authors, 549.  
 Seshan, P. A. See Sen, K. C., jt. author, 575.  
 Shanif, M., 546.  
 Sizoo, G. J. See Dols, M. J. L., et al., jt. authors, 574.  
 Smith, D. J. W. See Derrick, E. H., et al., jt. authors, 544.  
 Smith, J. M., 592.  
 Smithburn, K. C. See Sabin, F. R., et al., jt. authors, 521.  
 Snieckiene, P., 533.  
 Soemanegara, R. M. See de Moulin, F., jt. author, 517.  
 Solandt, D. Y. See Thalheimer, W., et al., jt. authors, 583.  
 Stewart, Helen M., 531.  
 Stewart, J., & McCallum, Jennie W., 575.  
 Stewart, J. L., 529.  
 Stewart, W. L., *quat*, 562.  
 Stieglecker, G., 584.  
 Stock, P. G., 581.  
 Stockklauser, 567.  
 Stryzak, A. S., 542.

## Index.

- Stuart, H. O. See Delaplane, J. P., et al.,  
jt. authors, 523.  
Swales, W. E., 547, *bis*, 565.
- Tacken, P. H. W., 569  
Talsaine, T. T., 549.  
Tang, F. F., & Wei, H., 542.  
Tanganyika Territory, Ann. Rep. Dep. vet.  
Sci. Anim. Husb., 1937, 590.  
—, Veterinary Education, 1937, 588.  
Thalhimer, W., Solandt, D. Y., & Best,  
C. H., 583.  
Thieffry, S. See Bonnet, H., et al., jt.  
authors, 520.  
Thomas, J. J., 579.  
Thomson, W. See Fraser, A. H. H., et al.,  
jt. authors, 550.  
Thorshaug, N. P., 593, 594, *bis*, 595.  
Tillett, W. S., 516.
- Tischius, A. See Seibert, Florence B.,  
et al., jt. authors, 554.  
Tobback, L., 546.  
du Toit, P. J., 589.  
Tran-Ngoc-Hoan. See le Roux, G., jt.  
author, 537.  
Travassos, J., 544.
- Union of S. Africa, Rep. Inst. med. Res.,  
1936, 592.  
—, Rep. Inst. med. Res., 1937, 592.
- Vaz, Z., 545.  
Vet. Archiv., 596.  
Vet. Med., 540.  
Vet. Rec., 588.  
Voegel, H., 573.
- Wagatsuma, S. See Nakamura, J., et al.,  
jt. authors, 536.
- Wall, J. F. See McNutt, S. H., jt. author  
575.  
Warbritton, Virgene. See Berliner, V., jt.  
author, 584.  
Ward, H. K., & Rudd, G. V., 516.  
Wei, H. See Tang, F. F., jt. author, 542.  
Weinberg, M., & Kreguer, A., 558.  
Wells, A. Q., 520.  
Wien. tierärztl. Mschr., 593.  
Wilson, J. E., 588.  
Wüstenberg, J., 516.  
Wyckoff, R. W. G. See Eichhorn, A., jt.  
author, 540.
- Zagrodzki, K., 556.  
Zakrzewski, A., 535.  
Zelnert, 580.  
Zschokke, W. See Gräub, E., jt. author,  
527.  
Zwemer, R. L., & Culbertson, J. T., 531.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

## INDEX VETERINARIUS.

See notice on page 4 of cover.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:- Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity]...	599-616	DISEASES, GENERAL :	
Streptococcal mastitis ... ..	599	[General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms] ...	640-645
Anthrax ... ..	601		
Tuberculosis ... ..	603	NUTRITION IN RELATION TO DISEASE :	
Pasteurella infection ... ..	607	[Articles placed in the section " Diseases, General " may also contain references to nutritional factors] ... ..	645-649
Salmonella infection ... ..	610	Mineral deficiency ... ..	645
Brucella infection ... ..	613	Vitamin deficiency ... ..	647
Anaerobic infection ... ..	614		
Mycosis ... ..	616	PUBLIC HEALTH ... ..	649-651
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	616-621	Milk hygiene ... ..	649
Trypanosomiasis ... ..	616	Meat hygiene ... ..	651
Piroplasmosis ... ..	618		
Spirochaetosis ... ..	620	THERAPEUTICS .. ..	652-654
DISEASES CAUSED BY VIRUSES ... ..	621-627	POISONS AND POISONING ... ..	654-655
Foot and mouth disease ... ..	621	PHYSIOLOGY ... ..	656-660
Rinderpest ... ..	622	TECHNIQUE AND APPARATUS ... ..	660-662
PARASITES IN RELATION TO DISEASE [ARTHIPODS] ... ..	627-629	MISCELLANEOUS ... ..	662-663
Sheep blowfly ... ..	627	REPORTS ... ..	663-669
Ox warble-fly ... ..	627	Great Britain ... ..	663 & 669
Mange ... ..	629	Canada ... ..	666
PARASITES IN RELATION TO DISEASE [HELMINTHS] ... ..	629-634	New Zealand ... ..	668
Trematodes ... ..	629	Tanganyika Territory ... ..	668
Cestodes ... ..	631		
Nematodes ... ..	632	BOOK REVIEWS ... ..	669-670
IMMUNITY [including Allergic and Serological Diagnosis] ... ..	634-639		
Tuberculin ... ..	634		
Serological tests ... ..	637		

# INDEX TO AUTHORS

- Abdussalam, M., 628, 629  
 Ahlfeld, I. See Gildmeister, E., *jt.* author, 626.  
 Akazawa, S., & Hotta, T., 625.  
 Amer J. publ. Hlth, 623.  
 Andrews, W. H., 665.  
 Angerine, D. M. See Freund, J., *jt.* author, 605.  
 Ann. Rep. Chief Med. Offr Min Hlth, 1937, 669.  
 Antopol, W. See Glick, D., et al., *jt.* authors, 660.  
 Archer, G. T. L., 612.  
 Baker, D. W., & Stone, W. S., 620.  
 Balozet, L., 624.  
 Barber, Mary, 606.  
 Barcroft, J., & Kennedy, J. A., 658  
 —, —, & Mason, M. F., 658, *bis*.  
 Barnes, R., 607.  
 Barnett, G., 634.  
 Bauerleind, J. C., Schumacher, A. E., Hodson, A. Z., Norris, L. C., & Heuser, G. F., 657.  
 Beatup, A. J., & Morgan, E. L., 631.  
 Beerens, J., 636.  
 Belle, G., 655, *bis*.  
 Beller, K., 637.  
 Belschner, H. G., & Hindmarsh, W. L., 627, *bis*.  
 — See also Hindmarsh, W. L., *jt.* author, 627.  
 Benjamin, M. S. See Griffiths, E. I., *jt.* author, 646.  
 Berge, E. See Rodei, O., *jt.* author, 670.  
 Bernard, M. See Pigoury, L., *jt.* author, 626.  
 Berry, A. E., 649, *bis*.  
 Berthelon. See Leshouyries, et al., *jt.* authors, 608.  
 Bhalerao, G. D., 630.  
 Buchmaier, 621.  
 Binns, H. R., 654.  
 Bird, H. R., Olsson, J. J., Elvehjem, C. A., & Hart, E. B., 648.  
 Bishop, P. M. F., Boycott, Muriel, & Zuckerman, S., 654.  
 Blanc, G., & Martin, L. A., 624.  
 Blumer, C. C. See Hindmarsh, W. L., *jt.* author, 616.  
 Boerner, J., 611.  
 Boquet, A., 606.  
 Boulay, P., 618.  
 Boycott, Muriel. See Bishop, P. M. F., et al., *jt.* authors, 654.  
 Boyd, W. L. See Kernkamp, H. C. H., *jt.* author, 642.  
 Brannon, H. D., Tisdall, F. F., & Drake, T. G. H., 648.  
 Brazici. See Leshouyries, et al., *jt.* authors, 608.  
 Brit med J., 647.  
 Broom, J. C. See Hoare, C. A., *jt.* author, 617.  
 Bruckner, V. See Ivanovics, G., *jt.* author, 601.  
 Bruggemann, H., 661.  
 Bryan, C. S. See Horwood, R. E., *jt.* author, 599.  
 Bunney, W. E., & Gottschall, R. Y., 635.  
 Burn, G. A. H., 650.  
 Butler, W. J., Warren, D. M., & Hammersland, H. L., 644.  
 Gallot, J. See Lavier, G., et al., *jt.* authors, 630.  
 Calmette, A., 637.  
 Camara, A., 622.  
 Cameron, A. F., 603, 666.  
 Cameron, G. D. W., 639.  
 Cansev, O. R., 628.  
 Celoria, Maria L. See Trossarelli, L., *jt.* author, 606.  
 Cernaianu, C., 618.  
 Chandier, Asa C., 633.  
 Channon, H. J., Loach, J. V., & Tristram, G. R., 657.  
 Chapman, C. H., & Lach, C. W., 638.  
 Charitat, M., 622.  
 Chinn, A. B. See Vedder, E. R., *jt.* author, 647.  
 Chinn, B. D., 652.  
 Christophers, S. R., & Fulton, J. D., 616.  
 — See also Fulton, J. D., *jt.* author, 616.  
 Ciurca, I., 631.  
 Clarke, E. H., 619.  
 Comandon, J., & de Fonbrune, P., 632.  
 Crew, F. A. E., 644.  
 Curasson, G., 622.  
 Dam, H., & Glavind, J., 641.  
 Davajan, E. A., 633.  
 Deem, A. W. See Thorp, F., Jr., *jt.* author, 655.  
 Defries, R. D., 649.  
 Delage, B., 625.  
 Delpy, L., & Raiva, A., 620.  
 —, & Rastegar, R., 613.  
 Desczausz, J. See Roubaud, E., *jt.* author, 632.  
 Deschiens, R. See Roubaud, E., *jt.* author, 632.  
 Donatien, A., 618.  
 Dowdeswell, R. M., 630.  
 Dragstedt, L. F., van Prohaska, J., & Harms, H. P., 656.  
 Drake, T. G. H. See Brannon, H. D., et al., *jt.* authors, 648.  
 Durant, A. J., & McDougale, H. C., 641.  
 Edwards, S. J., 662.  
 Ehrlich, 613.  
 Ellinger, C., 649.  
 Elvehjem, C. A. See Bird, H. R., et al., *jt.* authors, 648.  
 Enders, J. F. See Hammon, W. D., *jt.* author, 621.  
 Endrejat, E., 631.  
 Englebreth-Holm, J. See Fredriksen, O., *jt.* author, 643.  
 Enigk, K. See Weizel, R., *jt.* author, 632.  
 Ersov, V. S., 634.  
 Evrand, A. See Guttmann, G., et al., *jt.* authors, 650.  
 Farley, N. H., 657.  
 Faure, L., 653.  
 Fawcett, S. J., 668.  
 Feinster, R. F., 623.  
 Feldman, W. H., & Fitch, C. P., 645.  
 Fenstermacher, R. See Pomietov, B. S., *jt.* author, 611.  
 Ferguson, Jean. See Udall, D. H., et al., *jt.* authors, 599.  
 Fitch, C. P. See Feldman, W. H., *jt.* author, 635.  
 Fitzpatrick, Florence. See Zinsser, H., et al., *jt.* authors, 626.  
 Flexner, L. B., 659.  
 Foley, S. J., 657.  
 Folli, R. H., Jr., 634.  
 de Fonbrune, P. See Comandon, J., *jt.* author, 632.  
 Fourie, P. J. J., & Rimington, C. R., 640.  
 — See also Rimington, C., *jt.* author, 661.  
 — See also Rimington, C., et al., *jt.* authors, 640.  
 Fraser, H. F., Topping, N. H., & Scirell, W. H., 661.  
 Fredriksen, O., & Englebreth-Holm, J., 643.  
 French, M. H., 617.  
 Freund, J., & Angerine, D. M., 605.  
 Fritzsche, 603.  
 Fulstow, H., 655.  
 Fulton, J. D., & Christophers, S. R., 616.  
 — See also Christophers, S. R., *jt.* author, 616.  
 Ganslmayer, R., 629.  
 Gebauer, O., 629.  
 Gendreau, L. A., 646.  
 Gildmeister, E., & Ahlfeld, I., 626.  
 Glavind, J. See Dam, H., *jt.* author, 641.  
 Glick, D., Lewin, A., & Antopol, W., 660.  
 Goddard, E. J., 662.  
 Goreczky, L., & von Ludany, G., 639.  
 Gottschall, R. Y. See Bunney, W. E., *jt.* author, 635.  
 Greey, P. H., 652.  
 Griffiths, E. I., & Benjamin, M. S., 646.  
 Groenewald, J. W. See Williams, J. G., et al., *jt.* authors, 642.  
 Grossfeld, J., 670.  
 Grund, R., 645.  
 Grycz, E., & Teklinski, A., 613.  
 Guenther, D. F., 641.  
 Guilhon, J. See Henry, A., *jt.* author, 651.  
 Guttmann, G., Mocquet, G., & Evrand, A., 650.  
 Gunn, W. R., 628, 607.  
 Gwatkin, R., & MacLeod, A. H., 653.  
 Haberer, C., 631.  
 Hadley, F. B., 654.  
 Hagedoorn, A. L., 670.  
 Hamann, F. E., & Huddleson, I. F., 652.  
 Hammersland, H. L. See Butler, W. J., et al., *jt.* authors, 644.  
 Hammon, W. D., & Laders, J. F., 625.  
 Harms, H. P. See Dragstedt, L. F., et al., *jt.* authors, 656.  
 Harshfield, G. S. See Thorp, F., Jr., *jt.* author, 654.  
 Hart, E. B. See Bird, H. R., et al., *jt.* authors, 648.  
 Hart, L. See Hindmarsh, W. L., *jt.* author, 655.  
 Hearle, F., 627.  
 Heniv, A., & Guilhon, J., 653.  
 Henry, Kathleen M., & Kon, S. K., 645.  
 Hepding, L., 605.  
 Herrmann, W., 612.  
 Heuser, G. F. See Bauerleind, J. C., et al., *jt.* authors, 657.  
 Hewetson, H. R., 643.  
 Hilbert, K. F., & Tav, H., 608.  
 Hilton, G., 666.  
 Hindmarsh, W. L., 620, 642, *bis*.  
 —, & Belschner, H. G., 627.  
 —, & Blumer, C. C., 646.  
 —, & Hart, L., 655.  
 — See also Belschner, H. G., *jt.* author, 627, *bis*.  
 Hoare, C. A., & Broom, J. C., 617.  
 Hodson, A. Z. See Bauerleind, J. C., et al., *jt.* authors, 657.  
 Holmes, C. R. See Turner, P. R., *jt.* author, 607.  
 Horwood, R. E., & Bryan, C. S., 599.  
 Hoshi, S. See Sato, S., *jt.* author, 659.  
 Hotta, T. See Akazawa, S., *jt.* author, 625.  
 Huddleson, I. F. See Hamann, E. E., *jt.* author, 652.  
 Hurst, E. W., 626.  
 Hutchinson, J. H., 647.  
 Hutson, L. R., 634.  
 Huyghens, F., & Lefevre, A., 633.  
 Idnani, J. A., 619.  
 Ilavsky, J. See Patocka, F., *jt.* author, 615.  
 Irarite, D. R., 618.

# Index.

- Ivanovics, G., 601.  
 —, & Bruckner, V., 601.  
 — See also Tomcsik, J., jt author, 601, *his*.  
 Jansen, J., 643.  
 Johnson, A., 660  
 Johnson, S. D. See Udall, D. H., et al., jt authors, 599.  
 Jos, E. C., 651  
 J Coun sci industr. Res. Aust., 662.  
 Joyner, A. L. See Sabu, Florence R., jt author, 636  
 Kalmbach, E. R., 615.  
 Karsten, 614  
 Kennedy, J. A. See Barcroft, J., jt author, 658  
 — See also Barcroft, J., et al., jt. authors, 658, *his*  
 Kerkamp, H. C. H., & Boyd, W. L., 642  
 Keri, K. B. See Otto, G. F., jt author, 634.  
 Kertson, H. See Wright, Elizabeth, V., jt author, 660  
 Khot, N. D., 639  
 Klickner, A. L. See Klein, L. A., et al., jt authors, 599  
 Klein, L. A., Klickner, A. L., & Scheidey, S. F., 599  
 Knight, A., 668  
 Knupling, F. F. See Wells, R. W., jt author, 628  
 Kobusiewicz, T., 615  
 de Kock, G., 621, *his*  
 Kon, S. K. See Henry, Kathleen M., jt author, 645  
 Krethmar, H. H., 600.  
 Lanect, 656, 657  
 Lavier, G., Leroux, R., & Callot, J., 630  
 Lee, C. D., & Wilke, H. L., 613  
 Lefevre, A. See Huyghens, F., jt author, 653  
 Leroux, R. See Lavier, G., et al., jt authors, 650.  
 Leshouyves, Berthelon, & Brazier, 608  
 Lewin, A. See Glick, D., et al., jt authors, 660  
 Libby, R. L., 660  
 Lieb, C. W. See Chapman, G. H., jt author, 638  
 Loach, J. V. See Channon, H. J., et al., jt authors, 657.  
 Loewer, A. A., 654  
 von Ludany, G. See Goretzky, L., jt author, 639.  
 McDougale, H. C. See Durant, A. J., jt author, 644  
 MacGregor, T. N. See Winterton, W. R., jt author, 654  
 McKendrick, A. G., 624  
 MacLeod, A. H. See Gwatkin, R., jt author, 653.  
 Maet, Irene. See Wilson, G. S., jt author, 652.  
 Markuze, Zofia, 648  
 Marriott, W. H., 613  
 Marsh, H. See Jummcliff, E. A., jt author, 615  
 Martin, L. A. See Blanc, G., jt author, 624.  
 Mason, M. F. See Barcroft, J., et al., jt. authors, 658, *his*.  
 Masson, G., 658.  
 Mellanby, E., 602.  
 Merrill, L. A., 652.  
 Meyer, K., 612.  
 Minett, F. C., 603.  
 Mir-Damadi, M., 637.  
 Mirecki, O. J., 661.  
 Mitchell, C. A. See Plummer, P. J. G., et al., jt. authors, 653  
 Mocquot, G. See Guittonneau, G., et al., jt. authors, 650.  
 Moon, V. H., 640  
 Morgan, E. L. See Bearup, A. J., jt author, 631  
 Mornet, M., 622.  
 Neisser, H., 601  
 Nels, P., 638.  
 Norris, I. C. See Bauernfeind, J. C., et al., jt authors, 657.  
 Nosik, A. F., 632  
 Ogneru, D. See Pop, A., jt author, 618  
 Oleson, J. J. See Bird, H. R., et al., jt. authors, 648  
 Oppermann, T., 641.  
 Otto, G. F., & Keri, K. B., 634  
 Pallasse, G., 604  
 Parish, H. J., 635  
 Parlier, 631  
 Paterson, J. S., 606  
 Patocka, F., & Ilavsky, J., 615.  
 Pervakov, A. J., 654  
 Petagnani, 624  
 Pfaff, G., 623  
 Philippe, J., 623  
 Picard, J. H., 621  
 Pigouly, L., 618  
 —, & Bernard, M., 626.  
 Plummer, P. J. G., Mitchell, C. A., & Walker, R. V. L., 653  
 Pomeroy, B. S., & Fenstermacher, R., 611.  
 Pop, A., & Ogneru, D., 618  
 Popescu-Baran, M., 628  
 Price, R. M., 604  
 Priestley, F. W., 637.  
 Proc Dis. Anim. Lond., 1937, 663, 665  
 van Prohaska, J. See Dragstedt, L. F., et al., jt authors, 656  
 Radv, A. See Delpy, L., jt author, 620.  
 Rakette, H., 660  
 Rustgar, R. See Delpy, L., jt author, 613.  
 Rautmann, H., 603  
 Rayski, C., 629  
 Rep. Dep. Agric. Brit. Columbia, 1937, 667, 668  
 Rep. Dep. Agric. N. Z., 1937-1938, 668  
 Rep. Dep. Agric. Tanganyika, 1937, 668  
 Rep. vet. Dis. Gen. Dep. Agric. Can., 1936-1937, 666, 667, *his*  
 Richter, W., 621.  
 Rimmington, C., & Fourie, P. J. J., 661.  
 —, Roets, C. G. S., & Fourie, P. J. J., 640  
 Rimmington, C. R. See Fourie, P. J. J., jt. author, 640  
 Roder, O., & Berge, E., 670  
 Roets, C. G. S. See Rimmington, C., et al., jt authors, 640  
 Rossi, P., 604, 645  
 Roubaud, F., & Descazeaux, J., 632.  
 —, & Deschiens, R., 632  
 Rudduck, H. B., & Willis, R. A., 644.  
 Sabu, Florence R., 636  
 —, & Joyner, A. L., 636  
 Sander, G. See Schaefer, W., jt author, 639.  
 Sato, S., & Hoshi, S., 659.  
 Schaefer, W., & Sander, G., 639  
 Scheidey, S. F. See Klein, L. A., et al., jt. authors, 599  
 Schmid, F., 629, *his*  
 Schofield, F. W., 616, *his*  
 Schumacher, A. E. See Bauernfeind, J. C., et al., jt authors, 657  
 Sebrell, W. H. See Fraser, H. F., et al., jt. authors, 661  
 Seelge, Hildegard, 614.  
 Seylarth, Martha, 630  
 Shanks, P. L., 611  
 Shirlaw, J. F., 607.  
 Smith, J., 621, *his*.  
 Smith, M. Doreen, 650.  
 Smith, W. A., 653  
 Soni, B. N., 627  
 Stamatini, N., 602  
 Standfuss, R., 612.  
 Steyn, D. G., 662  
 — See also Williams, J. G., et al., jt. authors, 642  
 Stojlowa, E. R., 611.  
 Stone, W. S. See Baker, D. W., jt. author, 620.  
 Sybesma, R. P., 629.  
 Tax, H. See Hilbert, K. F., jt author, 608  
 Tekhinski, A. See Grycz, E., jt author, 613.  
 Thoonen, J. See Verstraete, A., jt author, 643.  
 Thorp, F. Jr., & Deem, A. W., 655.  
 —, & Harshfield, G. S., 654  
 Timoney, J. F., 605  
 Tisdall, F. F. See Branson, H. D., et al., jt authors, 648.  
 Tobey, J. A., 651  
 Tomcsik, J., & Ivanovics, G., 601, *his*.  
 Topping, N. H. See Fraser, H. F., et al., jt authors, 661  
 Travassos, L., 633.  
 Tristram, G. R. See Channon, H. J., et al., jt authors, 657  
 Trossarelli, L., & Celoria, Maria L., 606.  
 Truche, C., 638  
 Tunncliff, E. A., & Marsh, H., 615  
 Turner, P. R., & Holmes, C. R., 607.  
 Udall, D. H., Johnson, S. D., & Ferguson Jean, 599.  
 Valle, A. L., 606  
 Vedder, E. B., 647.  
 —, & Chinn, A. B., 647  
 Verstraete, A., & Thoonen, J., 643.  
 Vet. Rec., 607  
 Vittor, R., 608  
 de Waal, H. L., 655  
 Walker, R. V. L. See Plummer, P. J. G., et al., jt authors, 653.  
 Wallis, G. C., 648  
 Warren, D. M. See Butler, W. J., et al., jt. authors, 644.  
 Watson, E. A., 667  
 Weaver, C. H., 667.  
 Wei, H. See Zimsser, H., et al., jt authors, 626  
 Weld, Julia T., 600  
 Wellings, A. W., 669  
 Wells, R. W., & Knupling, F. F., 628.  
 Wetzel, R., & Engek, K., 632  
 Wilcke, H. L. See Lee, C. D., jt author, 643.  
 Williams, J. G., Steyn, D. G., & Groenewald, J. W., 612  
 Willis, R. A. See Rudduck, H. B., jt. author, 644  
 Wilson, G. S., & Maet, Irene, 652  
 Winter, A. R., 638  
 Winterton, W. R., & MacGregor, T. N., 654.  
 Witzgmann, J., 642  
 Wood, H., 661  
 Wood, S. N., 649  
 Wright, Elizabeth, V., & Kertson, H., 660.  
 Wright, R. D., 656, *his*  
 Wyssmann, E., 640  
 Yamamoto, S., 614, *his*  
 Zimsser, H., Fitzpatrick, Florence, & Wei, H., 626  
 Zuckerman, S. See Bishop, P. M. T., et al., jt authors, 651.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

## **INDEX VETERINARIUS.**

*See notice on page 4 of cover.*

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:- Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics: Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity]...	671-691	IMMUNITY [including Allergic and Serological Diagnosis] ...	721-724
Streptococcal mastitis ...	671	Tuberculin tests ...	721
Anthrax ...	673	Serological tests ...	722
Tuberculosis ...	674		
Pasteurella infection ...	682	DISEASES, GENERAL :	
Salmonella infection ...	683	[General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms] ...	724-728
Brucella infection ...	684		
Anaerobic infection ...	688		
Actinomycosis ...	690		
DISEASES CAUSED BY PROTOZOAN PARASITES ...	691-700	NUTRITION IN RELATION TO DISEASE :	
Blackhead of turkeys ...	691	[Articles placed in the section " Diseases, General " may also contain references to nutritional factors] ...	729-732
Trypanosomiasis ...	692		
Trichomoniasis ...	694		
Coccidiosis ...	696		
Buffalo malaria ...	697		
Piroplasmosis ...	698		
DISEASES CAUSED BY VIRUSES ...	700-713	PUBLIC HEALTH ...	732-733
General papers ...	700		
Foot and mouth disease ...	701	THERAPEUTICS ...	733-737
Rinderpest ...	705	Sulphanilamide ...	733
Bovine contagious pleuropneumonia ...	705		
Equine infectious anaemia ...	707	POISONS AND POISONING ...	737-740
Dog distemper ...	709		
Influenza ...	710	PHYSIOLOGY ...	740-742
Avian virus diseases ...	711		
PARASITES IN RELATION TO DISEASE [GENERAL] ...	713-714	TECHNIQUE AND APPARATUS ...	742-743
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ...	714-716		
Tick infestation ...	714	MISCELLANEOUS ...	743-744
PARASITES IN RELATION TO DISEASE [HELMINTHS] ...	716-721		
General papers ...	716	REPORTS ...	744-746
Trematodes ...	718	British Columbia ...	744
Cestodes ...	719	New South Wales ...	745
Nematodes ...	719	Italy ...	745
		BOOK REVIEWS ...	746-748



# Index

- , Vassman, A., & Reinié, L., 735.  
 Levine, N. D. See Boley, L. E., et al., jt. authors, 736.  
 Levine, P. P., 720.  
 Liebig, C. W. See Chapman, G. H., et al., jt. authors, 733.  
 Lloverol, H., 736.  
 Love, W. G., Millar, J. A. S., & Rawlings, W. B., 688.  
 Lührs, E., 718.  
 Lupu, A. See Mihailescu, M., et al., jt. authors, 676.  
 Lurie, M. B., 679, *bis*.  
 Lush, D. See Burnet, F. M., jt. author, 708.  
 Maassen, H., 694.  
 McClement, J., & Davis, J. G., 672.  
 —. See also Davis, J. G., jt. author, 672, *bis*.  
 —. See also Davis, J. G., et al., jt. authors, 672.  
 McEwen, A. D. See Priestley, F. W., jt. author, 686.  
 McNee, J. W. See Boycott, J., jt. author, 683.  
 Macrae, T. F. See Chick, H., et al., jt. authors, 731.  
 Malyn, S. A., 721.  
 Mann, T., & Keshin, D., 740.  
 Marcato, A., 708.  
 Martin, A. J. P. See Chick, H., et al., jt. authors, 731.  
 Martin, C. J. See Chick, H., et al., jt. authors, 731.  
 Martin, L. A. See Blanc, G., jt. author, 719, *bis*.  
 Mazzaracho, V., 686.  
 Meinicke, E., 723, *bis*.  
 Merchant, L. A. See Rosenbusch, C. T., jt. author, 682.  
 Mesrobianu, J. See Levaditi, C., et al., jt. authors, 712.  
 Meyer, H., 707.  
 Meyer, K. F. See Stewart, R. A., jt. author, 690.  
 Meymandi, M. H. See Darraspen, E., et al., jt. authors, 726.  
 Mihailescu, M., Lupu, A., & Tomescu, V., 676.  
 Mikić, F. See Jezic, J., et al., jt. authors, 674.  
 Mullar, J. A. S. See Love, W. G., et al., jt. authors, 688.  
 Millen, T. W. See Eveleth, D. F., jt. author, 730.  
 Miller, F. W. See Andrews, J., jt. author, 694.  
 Miller, W. T., Mingle, C. K., Murdock, F. M., & Heishman, J. O., 734.  
 Mingle, C. K. See Miller, W. T., et al., jt. authors, 734.  
 Minning, W., 696.  
 Mirri, A., 701.  
 Mower, F., 689.  
 Mumford, P. B., 743.  
 Murdock, F. M. See Miller, W. T., et al., jt. authors, 734.  
 Närvinen, R. See Kalaja, L., jt. author, 731.  
 Nakamura, J., Oyama, S., & Wagatsuma, S., 712.  
 Narbutas, J., 732.  
 Neits, W. O., & Thomas, A. D., 699.  
 Nicolaus, S., 701.  
 Nicolaus, See Bartels, jt. author, 674.  
 Niimi, D., 691.  
 O'Brien, J. R. See Peters, R. A., jt. author, 731.  
 Oldham, J. N., 716.  
 Oppermann, T., & Stümpke, G., 708.  
 Ortlepp, R. J., 719.  
 Oswald, B., 714.  
 Oyama, S. See Nakamura, J., et al., jt. authors, 712.  
 Parker, R. R., & Davis, G. E., 715.  
 Parsons, D. L., 728.  
 Pavlov, P., & Guenev, C., 692.  
 Pegrefli, G., 724.  
 Peters, R. A., & O'Brien, J. R., 731.  
 Petrović, D. M., 721.  
 Pfeffer, A. See Seelmann, M., et al., jt. authors, 685.  
 Piepenstock, H., 725.  
 Pierre, M., 741.  
 Plum, N., 675.  
 —, & Sylborg, N. C., 675.  
 Poisson, J. See Blanchard, L., et al., jt. authors, 727.  
 Pomeroy, B. S. See Fenstermacher, R., jt. author, 688.  
 Postma, C., 683.  
 Pothmann, E., 740.  
 Priestley, F. W., & McEwen, A. D., 686.  
 Proc. roy. Soc. Ser. B, 700.  
 Proc. R. Soc. Med., 733.  
 Purchase, H. S., 705, 711.  
 Radvila, P., 682.  
 Raevskaja, Z. A., 719.  
 Rao, M. A. N., 697.  
 Ratti, R., 709.  
 Rawlings, W. B. See Love, W. G., et al., jt. authors, 688.  
 Reichsgesundheitsblatt, 687.  
 Reinié, L. See Levaditi, C., et al., jt. authors, 712, *bis*, 735.  
 R. p. Dep. Agric. Can., 1936, 744.  
 Rep. 1st Imp. vet. Conf. Lond., 1938, 671, 700, 701.  
 Rep. nat. Res. Coun. Can. 1936-37, 713.  
 Reyes, R. V., 719.  
 Richou, R. See Holstein, G., jt. author, 735.  
 van Roonckel, H., Bullis, K. L., & Clarke, M. K., 711.  
 Rogers, H. J. See Davis, J. G., et al., jt. authors, 672.  
 Rosati, T., 683.  
 Rosenbusch, C. T., & Merchant, L. A., 682.  
 Rosenhaupt, H., 703.  
 Ross, H. E. See Dalling, T., jt. author, 688.  
 Ross, I. C., Chamberlin, W. E., & Turner, H. N., 729.  
 Runnells, R. A., 746.  
 Sabin, F. R. See Smithburn, K. C., jt. author, 722.  
 Salzer, H., 694.  
 Saenz, A., 676, 677, 678.  
 —, & Fato, D. M., 680.  
 Savickus, J., 739.  
 van der Schaaf, A. See Kraneveld, F. C., jt. author, 714.  
 Scheibe, H., 723.  
 Schermer, S., & Deppe, K., 732.  
 Schmid, E., 726.  
 Schoop, G., & Stolz, A., 695.  
 Schwerdt, 733.  
 Science, 706.  
 Seddon, H. R., & King, R. O. C., 738.  
 Seelmann, M., Wolf, C. H., & Pfeffer, A., 685.  
 Seren, E., 687.  
 —. See also Lanfranchi, A., jt. author, 725.  
 Silberberg, M., & Silberberg, R., 741.  
 Silberberg, R. See Silberberg, M., jt. author, 741.  
 Simitch, T., & Kostutch, D., 696.  
 Simons, H., 697.  
 Smithburn, K. C., 680.  
 —, & Sabin, F. R., 722.  
 Soltyz, M. See Grycz, E., et al., jt. authors, 723.  
 Spena, A., 699.  
 Spiegl, A., 720.  
 Srivastava, H. D., 718.  
 Stamatini, L. See Levaditi, C., et al., jt. authors, 712.  
 Standfuss, R., & Koch, R., 684.  
 Steffens, M., 736.  
 Steiner, M., Zuger, B., & Kramer, B., 730.  
 Steuer, W., & von Bock, K., 687.  
 Stolz, R. A., & Meyer, K. F., 690.  
 Stolz, A. See Schoop, G., jt. author, 695.  
 Stone, R. V., 733.  
 Stroh, 703.  
 Stümpke, G. See Oppermann, T., jt. author, 708.  
 Sylborg, N. C. See Plum, N., jt. author, 675.  
 Tamarin, J. B. See Kulikov, N. S., jt. author, 737.  
 Taskin, J., 735.  
 Tekladoff, C., 697.  
 —, & Grycz, E., et al., jt. authors, 723.  
 Thayer, J. D., 722, *bis*.  
 Thomas, A. D. See Netz, W. O., jt. author, 699.  
 Thomoff, Z. See Angelo, S., jt. author, 739.  
 Thorp, F. J. See Deem, A. W., jt. author, 696.  
 Tomescu, V. See Mihailescu, M., et al., jt. authors, 676.  
 Topaco, T., 692.  
 —, & Acevedo, R. A., 692.  
 Toumanoff, C., 697.  
 Trager, W., 715, 716.  
 Truong-Tan-Tgoc, 721.  
 Tsai, V., 744.  
 Turner, H. N. See Ross, I. C., et al., jt. authors, 729.  
 Underwood, E. J., 730.  
 Vassman, A. See Levaditi, C., et al., jt. authors, 735.  
 Vidal, C. See Carvalho, A., jt. author, 679.  
 Wadowski, S., 718.  
 Wagatsuma, S. See Nakamura, J., et al., jt. authors, 712.  
 Wagner, O., 717.  
 Walburn, L. E., 688.  
 Waldhelm, R., 724.  
 Waldmann, O., & Hirschfelder, H., 703.  
 Watts, P. S., 688.  
 Webster, W. M., 725.  
 Wedemann, W., 737.  
 Whipple, G. H. See Hahn, P. F., jt. author, 729.  
 Wieland, G., 724.  
 Wight, A. E., 674.  
 Wilks, R. A. C., 742.  
 Witterbolle, P. See Bessemans, A., et al., jt. authors, 699.  
 Wittfogel, H., 707.  
 Wolf, C. H. See Seelmann, M., et al., jt. authors, 685.  
 Wolf, J. See Hirschfelder, H. S., jt. author, 702.  
 Wolfson, F., 698.  
 Wolter, F., 687.  
 Young, F. G. See Folley, S. J., jt. author, 737.  
 Yutuc, L. M., 692.  
 Zuger, B. See Steiner, M., et al., jt. authors, 730.  
 Zylbertal, S. See Grycz, E., et al., jt. authors, 723.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

#### **Books for Review.**

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:—Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA		IMMUNITY [including Allergic	
AND FUNGI [see also Im-		and Serological Diagnosis]	777-790
munity] . . . . .	749-759	Tuberculin tests . . . . .	777
Streptococcal mastitis . . . . .	749	Serological tests . . . . .	778
Anthrax . . . . .	751	Various . . . . .	779
Tuberculosis (see also Götsche,		DISEASES, GENERAL:	
p. 791) . . . . .	751	[General diseases not dealt	
Tularaemia . . . . .	754	with under other head-	
Salmonella infection . . . . .	754	ings: Organic Diseases,	
Brucella infection . . . . .	755	Miscellaneous Diseases	
Various . . . . .	757	and Neoplasms] . . . . .	790-795
DISEASES CAUSED BY PRO-		NUTRITION IN RELATION TO	
TOZOAN PARASITES . . . . .	759-764	DISEASE:	
Trypanosomiasis . . . . .	759	[Articles placed in the sec-	
Trichomoniasis . . . . .	759	tion "Diseases, General"	
Bird malaria . . . . .	761	may also contain refer-	
Piroplasmiasis . . . . .	762	ences to nutritional fac-	
Bartonella infection . . . . .	763	tors . . . . .	795-799
Spirochaetosis . . . . .	764	Mineral deficiency . . . . .	795
DISEASES CAUSED BY VIRUSES	765-782	Vitamin deficiency . . . . .	798
General papers . . . . .	765	PUBLIC HEALTH . . . . .	799
Foot-and-mouth disease . . . . .	766	THERAPEUTICS . . . . .	799-803
Equine encephalomyelitis . . . . .	767	Sulphanilamide (see also	
Swine fever . . . . .	769	Shaw, p. 785) . . . . .	799
Dog distemper . . . . .	770	Protozoan diseases . . . . .	800
Swineherd's disease . . . . .	771	Helminth infestation . . . . .	802
PARASITES IN RELATION TO		POISONS AND POISONING . . . . .	803-807
DISEASE [ARTHROPODS] . . . . .	772-773	PHYSIOLOGY . . . . .	807
Sheep blowfly . . . . .	772	MISCELLANEOUS . . . . .	807-809
Tick infestation . . . . .	773	Animal research in New	
PARASITES IN RELATION TO		Zealand . . . . .	808
DISEASE [HELMINTHS] . . . . .	773-777	REPORTS . . . . .	810-811
Trematode infestation . . . . .	774	Great Britain . . . . .	810
Cestode infestation . . . . .	776	New Zealand . . . . .	810
		Estonia . . . . .	810
		BOOK REVIEWS . . . . .	811-812

# INDEX TO AUTHORS

- Acevedo, R. A. See Topacio, T., *jt* author, 750.
- Almay, F. See Krupski, A. E., et al., *jt* authors, 797.
- Almqvist, H. J., Mecchi, E., & Klose, A. A., 799.
- Anderson, R. J. See Cason, J., *jt* author, 753.
- Arnujo, E. R. See Suarez, E. H., *jt* author, 751.
- Askew, H. O., 795, *bis*
- Aychet, M., 792
- Baars, G., & Ghiesch, R., 755
- Bacanú, C., 752.
- Baker, D. W., 802.
- , Danks, A. G., & Britton, J. W., 802
- Beach, J. R. See Lubbehusen, R. E., *jt* author, 793.
- Beard, J. W., Finkelstein, H., Sealw, W. C., & Wyckoff, R. W. G., 768
- Bégué, P., 801
- Belle, G. See Velu, H., et al., *jt* authors, 800
- Bernth, O. See Dam, H., et al., *jt* authors, 798
- Besredka, A., & Gross, L., 794
- Biester, H. E., & Schwarte, L. H., 806
- Bindsley, G. See Jensen, K. A., et al., *jt* authors, 787, *bis*.
- Bishop, L. M. See Fitch, C. P., *jt* author, 750.
- le Blanc, T. J. See Foshay, L., *jt* author, 788.
- Bloom, W., & Tahaferro, W. H., 761
- Bocca, C. R., 772
- Boquian, Y. See Lesné, E., *jt* author, 772.
- Bouchet, H., 771, 773
- Bouchet, L., 771, 772.
- See also Durand, P., et al., *jt* authors, 773.
- Bovin, A., & Mesrobian, L., 758
- Bradfield, D., & Smith, M. C., 798.
- Britton, C. J., 799.
- Britton, J. W. See Baker, D. W., et al., *jt* authors, 802
- Brooks, P. B., 750.
- Brown, H. C., 759
- Buck, G., 785.
- Burkey, L. A., Meigs, E. B., Sanders, G. P., & Rogosa, M., 749
- See also Meighs, E. B., et al., *jt* authors, 749
- Burnet, F. M., & Freeman, M., 782
- Buss, W., 795.
- Butozan, V. See Mirkovic, M., 784
- Caccavella, A., 791.
- Caillieu, R., 760
- Calvery, H. O., 804
- , Laug, E. P., & Morris, H. P., 804
- See also Grant, R. L., et al., *jt* authors, 804.
- See also Lightbody, H. D., *jt* author, 804.
- Camargo, F. See Giron, A. T., *jt* author, 792.
- Campanacci, D., 772, *bis*.
- Campbell, D. H., 783, 786, *bis*.
- Cannon, C. Y. See Thomas, D. H., *jt* author, 798.
- Carlson, E. R., 749.
- Carstena, P., & Prüter, J., 792
- Cason, J., & Anderson, R. J., 753
- Cavalletti, S., 762.
- Chalmers, C. H., 811.
- Charleux, 772
- Charleux, G., 772
- Chow, C. Y. See Hsü, H. F., et al., *jt* authors, 785.
- Christiansen, M., 785
- Claude, A., 771
- Clifcorn, L. E., Elvehjem, C. A., & Hart, E. B., 796.
- Clin. vet., Milano, 771.
- Cohrs, P., & Weber-Sprünge, W., 767
- Colin, 800.
- Conrad, R. M., & Scott, H. M., 807.
- Converse, H. T. See Meighs, E. B., et al., *jt* authors, 749.
- Cordier, G., & Ménager, J., 800.
- Dalrymple-Champneys, W., 799.
- Dam, H., Glavind, J., Bernth, O., & Hagens, E., 798
- Danckwortt, P. W., & Hotzel, J., 797.
- Danks, A. G. See Baker, D. W., et al., *jt* authors, 802
- David, H., 754.
- Demole, M., 771
- Detskowitz, M. W., 758
- Detwiler, H. A., & Markham, F. S., 771.
- Dowgiatto, J., 806
- Dräger, K., 770
- Drinker, C. K. See Yoffey, J. M., *jt* author, 807
- Du, S. D. See Hsü, H. F., et al., *jt* authors, 785.
- Durand, P., Giroud, P., Larrivé, E., & Mestrallet, A., 772, *bis*.
- , —, —, —, & Bouchet, L., 773
- Eichlet, W., 783
- Elvehjem, C. A. See Clifcorn, L. E., et al., *jt* authors, 796.
- See also Hove, E., et al., *jt* authors, 795
- See also Wiese, A. C., et al., *jt* authors, 796, *bis*
- Fatzer, H., 773
- Faure-Brac, 801
- Feldman, W. H., & Stasney, J., 787
- See also Stasney, J., *jt* author, 788.
- 794
- Finkelstein, H. See Beard, J. W., et al., *jt* authors, 768.
- Fitch, C. P., & Bishop, L. M., 750.
- Fleischhauer, G., & Hermann, G., 799
- Florence, R., 785
- Florent, A., 759.
- Forbes, J. C., 800.
- Foshay, L., & le Blanc, T. J., 788
- Frankie, G., & Profé, O., 752
- Freeman, M. See Burnet, F. M., *jt* author, 782.
- Fritzsche, K., 793.
- Gambinni, P., 756
- Gaulier, C., 803.
- Gill, D. A., & Graham, N. P. H., 782
- Ginetiene, E., 803.
- Giorgi-Eragne, 771
- Giron, A. T., 792.
- , & Camargo, F., 792
- Giroud, P. See Durand, P., et al., *jt* authors, 772, *bis*, 773
- Glavind, J. See Dam, H., et al., *jt* authors, 798.
- Ghiesch, R. See Baars, G., *jt* author, 755
- Götsche, N. O., & Plum, N., 791.
- Gräub, E., 767.
- Graham, N. P. H. See Gill, D. A., *jt* author, 782.
- Graham, R., & Sampson, J., 807
- Grant, R. L., Calvery, H. O., Laug, E. P., & Morris, H. J., 804.
- See also Morris, H. P., et al., *jt* authors, 804.
- Gross, L. See Besredka, A., *jt* author, 794.
- Guerrini, F. Z. See Mazza, S., *jt* author, 759.
- Haan & Maas, 767.
- Habermann, R. T. See Harwood, P. D., et al., *jt* authors, 802.
- Hagens, E. See Dam, H., et al., *jt* authors, 798.
- Haldane, J. B. S., 790.
- Halpin, J. G. See Wiese, A. C., et al., *jt* authors, 796, *bis*.
- Hamann, E. E., & Huddleson, I. F., 757.
- Hammond, J., 808.
- Hansen, A. See Jensen, K. A., et al., *jt* authors, 787, *bis*.
- Harford, C. G. See Olitsky, P. K., *jt* author, 797.
- Haring, A. T. See Manwell, R. D., *jt* author, 801.
- Harms, F. See Miessner, H., *jt* author, 792
- Hart, E. B. See Clifcorn, L. E., et al., *jt* authors, 796.
- See also Hove, E., et al., *jt* authors, 795.
- See also Wiese, A. C., et al., *jt* authors, 796, *bis*.
- Hart, L., 761.
- Harwood, P. D., Habermann, R. T., & Jerstad, A. C., 802.
- See also Wehr, E. E., et al., *jt* authors, 802.
- Hastings, E. G. See Peterson, E. H., *jt* author, 750.
- Henninger, E., 754
- Henry, A., 783
- Hermann, G. See Fleischhauer, G., *jt* author, 799
- Hertzog, A. J., 789.
- Hinshaw, W. R., McNeil, E., & Kofoid, C. A., 760
- Hippmann, W., 755
- Hirato, K., Suckawa, M., Miura, S., & Nakanishi, K., 755
- See also Kurosawa, R., et al., *jt* authors, 754
- Holz, 769
- Hotzel, J. See Danckwortt, P. W., *jt* author, 797
- Hove, E., Elvehjem, C. A., & Hart, E. B., 795
- Howarth, C. R. See Shaw, J. N., 785
- Hsü, H. F., Du, S. D., & Chow, C. Y., 785.
- Huddleson, I. F. See Hamann, E. E., *jt* author, 757
- Hungerbühler, F. See Krupski, A. E., et al., *jt* authors, 797
- Hungertord, T. G., 770
- Hutt, F. B. See Lamoreux, W. F., *jt* author, 798.
- Insko, W. M., Jr. See Lyons, M., et al., *jt* authors, 796.
- Jacotot, H., 769.
- Jensen, K. A., Bindsley, G., Moller, S., Hansen, A., & Land, P., 787, *bis*.
- Jerstad, A. C. See Harwood, P. D., *jt* author, 802.
- Jörg, M. E., 801
- Johnson, B. C. See Wiese, A. C., et al., *jt* authors, 796
- Kaarde, J. See Kuiver, H., *jt* author, 797.
- Kasai, K. See Kurosawa, R., et al., *jt* authors, 754.
- Kuiver, H., & Kaarde, J., 797.
- Klose, A. A. See Almqvist, H. J., et al., *jt* authors, 799.
- Kofoid, C. A. See Hinshaw, W. R., et al., *jt* authors, 760.
- Kolbe, F., 811.
- Kolmer, J. A., & Rule, A. M., 800.
- Krestan, W., 764.
- Krupski, A., 797.
- Krupski, A. E., Hungerbühler, F., & Almay, F., 797.
- Kurosawa, R., Tatezawa, E., Hirato, K., & Kasai, K., 754.
- Lamoreux, W. F., & Hutt, F. B., 798.
- Lancet, 799.
- Larrivé, E. See Durand, P., et al., *jt* authors, 772, *bis*, 773.
- Laug, E. P., & Morris, H. P., 804.
- See also Calvery, H. O., et al., *jt* authors, 804.

## Index

- See also Grant, R. L., et al., jt. authors,  
804.  
— See also Morris, H. P., et al., jt. au-  
thors, 804.  
— See also Pagnini, U., 757.  
Pam. paris Inst. nauk. Gosp. wiew. Pulawy  
[Suppl. to Wiad. weteryn. 18 No.  
223], 811.  
Patto, O., 751.  
Peirce, A. W., 803.  
Penso, G., 771, bis, 772, ter.  
Peterson, E. H., & Hastings, E. G., 750.  
Pettit, M., 790.  
Pottagnani, G., 752.  
Pinkerton, H. See Weinmann, D., jt.  
author, 763.  
Plum, N., & Russeff, C., 788.  
— See also Götzsche, N. O., jt. author,  
791.  
Potemkina, V. A., 802.  
Pourains, Y. See Roger, H., jt. author,  
812.  
Profé, O. See Francke, G., jt. author, 752.  
Prüfer, J. See Carstén, P., jt. author,  
792.  
  
Raymond, M., 772.  
Records, E., 786.  
Register of Attested Herds (T.B. Scheme),  
751.  
Rochmüller, H., 802.  
Roch, M., 772.  
Röthel, R., 770.  
Roger, H., & Pourains, Y., 812.  
Rogosa, M. See Burkey, L. A., et al., jt.  
authors, 749.  
— See also Meigs, E. B., et al., jt.  
authors, 749.  
Rukavina, J. See Wertheim, P., jt. author,  
784.  
Kule, A. M. See Kolmer, J. A., jt. author,  
800.  
Russeff, C. See Plum, N., jt. author, 788.  
  
van Faceghem, R., 789.  
Sahai, I., 768.  
Sampson, J. See Graham, R., jt. author,  
807.  
Sanders, G., P., 749.  
— See also Burkey, L. A., et al., jt.  
authors, 749.  
— See also Meigs, E. B., et al., jt.  
authors, 749.  
Schaffler, J. M. See Wehr, E. E., et al., jt.  
authors, 802.  
Schmidt, H. W., 752.  
Schmidt, J., 799.  
Schwarte, L. H. See Bester, H. E., jt.  
author, 806.  
Schweitz, J., 763.  
Scott, H. M. See Conrad, R. M., jt.  
author, 807.  
Scrivner, I. H., 755.  
Sealy, W. C. See Beard, J. W., et al., jt.  
authors, 768.  
Selbie, F. R. See McIntosh, J., jt. author,  
795.  
Shaw, J. N., & Howarth, C. R., 785.  
Shirlaw, J. F., 762.  
Smith, F. R., & Mudge, C. S., 749.  
Smith, M. C. See Bradford, D., jt. author,  
798.  
Suekawa, M. See Hirato, K., et al., jt.  
authors, 755.  
Stabler, R. M., 759.
- Stahl, R., 773.  
Stanley, W. M., 765.  
Stanley, J., & Feldman, W. H., 788, 794.  
— See also Feldman, W. H., jt. author,  
787.  
Stauber, L. A., 761.  
Stender, M., 783.  
Sterne, M., 758.  
Stewart, D. F., 750.  
Strassl, 803.  
Sumez, E. H., & Armijo, E. R., 751.  
  
Tahaferro, W. H. See Bloom, W., jt.  
author, 761.  
Tatezawa, E. See Kurosawa, R., et al., jt.  
authors, 754.  
Thomas, B. H., & Cannon, C. Y., 798.  
Timoney, J. F., 756.  
Tomcski, J., 790.  
Topacio, J., & Acevedo, R. A., 756.  
Traub, E., 765.  
T.B. (Attested Herds) Scheme—Memo-  
randum, 751.  
T.B. (Attested Herds) Scheme, 1948, 751.  
Tunncliff, E. A. See Marsh, H., jt.  
author, 757.  
12th Rep. Dep. Sci. Ind. Res. N.Z., 1937-38,  
810.  
28th Rep. Develop. Comm., 1938, 810.  
  
Urech, 771.  
Urech, E., 771.  
  
Valtusauskaitis tegevus 1934-1935, 810.  
Vellisto, I., 789.  
Velu, H., Zottner, G., & Belle, G., 800.  
Viranen, A. I., 812.  
van Volkenberg, H. L., 763.  
  
Wacker, T., 772.  
Wallace, E. W. See Morris, H. J., jt.  
author, 804.  
van der Walke, N., 764.  
Weber-Springe, W. See Cohrs, P., jt.  
author, 767.  
Wehr, E. E., Harwood, P. D., & Schaffer,  
J. M., 802.  
Weinman, D., 764.  
— & Pinkerton, H., 763.  
Welch, H. M., Wentworth, J. A., & Mickle,  
J., 799.  
Wentworth, J. A. See Welch, H., et al., jt.  
authors, 799.  
Wertheim, P., 784.  
— & Rukavina, J., 784.  
Wiese, A. C., Elvehjem, C. A., Hart, E. B.,  
& Halpin, J. G., 796.  
—, Johnson, B. C., Elvehjem, C. A., Hart,  
E. B., & Halpin, J. G., 796.  
Wyckoff, R. W. G. See Beard, J. W., et al.,  
jt. authors, 768.  
— See also Lyon, B. M., jt. author, 768.
- Yoffee, J. M., & Drinker, C. K., 807.  
Young, D., 809.  
  
Zintel, J., 766.  
Zofjefskv, V., 769.  
Zottner, G. See Velu, H., et al., jt.  
authors, 800.

## INDEX VETERINARIUS.

See notice on page 4 of cover.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

#### **Books for Review.**

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

# CONTENTS

## LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:—Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE		PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity]...	813-838	IMMUNITY [including Allergic and Serological Diagnosis] ...	863-868
Mastitis ... ..	813	Tuberculin tests ... ..	863
Streptococci ... ..	814	Serological tests ... ..	865
Staphylococci ... ..	814	DISEASES, GENERAL [General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms] ... ..	868-880
Anthrax ... ..	815	NUTRITION IN RELATION TO DISEASE [Articles placed in the section "Diseases, General" may also contain references to nutritional factors] ... ..	881-887
Tuberculosis ... ..	817	Mineral deficiency ... ..	881
Corynebacterium infection ... ..	821	Vitamin deficiency ... ..	884
Pasteurella infection ... ..	823	PUBLIC HEALTH ... ..	887-891
Salmonella infection ... ..	823	Milk hygiene ... ..	887
Brucella infection ... ..	828	Meat hygiene ... ..	889
Anaerobic infection ... ..	832	THERAPEUTICS ... ..	891-896
Fungi ... ..	833	Sulphanilamide ... ..	891
DISEASES CAUSED BY PROTOZOAN PARASITES ... ..	835-844	POISONS AND POISONING ... ..	896-900
Trypanosomiasis (see also pp. 893-895) ... ..	835	PHYSIOLOGY ... ..	900-903
Trichomoniasis ... ..	838	TECHNIQUE AND APPARATUS ... ..	903
Coccidiosis ... ..	839	MISCELLANEOUS ... ..	903-904
Avian malaria ... ..	839	REPORTS ... ..	904-916
Toxoplasmosis ... ..	841	Great Britain ... ..	904
DISEASES CAUSED BY VIRUSES ... ..	844-854	Eire ... ..	906
Foot and mouth disease (see also Moine p. 823) ... ..	844	India ... ..	907
Equine encephalomyelitis (see also pp. 870-871) ... ..	847	South Africa ... ..	907
Rabies ... ..	849	British Colonies ... ..	909
Pox ... ..	851	European countries ... ..	910
PARASITES IN RELATION TO DISEASE [GENERAL] ... ..	854-855	U.S.A. ... ..	913
PARASITES IN RELATION TO DISEASE [ARTHROPODS] ... ..	855-857	BOOK REVIEWS ... ..	916-920
PARASITES IN RELATION TO DISEASE [HELMINTHS] ... ..	858-863		
Trematode infestation ... ..	859		
Cestode infestation ... ..	859		
Nematode infestation ... ..	861		

# INDEX TO AUTHORS

- Acosta, J. L., & Romana, C., 837.  
 Africa, C. M., & de Leon, W., 850  
 Ahmed, F. D., 909  
 Alessandrini, A., 829  
 Alcatraz, J. E., 862  
 —. See also Hegner, R., jt. author, 838.  
 Allison, J. B. See Green, D. F., et al., jt. authors, 891  
 Anderson, C. G., & Oag, R. K., 880.  
 Arling, P., Thevenot, L., & Vviller, J., 820.  
 Auchter, E. C., 881  
 Bailly, J. See Remlinger, P., jt. author, 866, *bis*  
 Baker, D. W. See Gibbons, W. J., jt. author, 839  
 Baldacci, E., 833  
 Balozet, L., 850  
 —. See also Burnet, E., jt. author, 839, *bis*  
 Barber, C. W., 877  
 zu Barghoiz, M. See Schulze, H., et al., jt. authors, 868  
 Bass, C. C., 884  
 Baudet, E. A. R. F., 895  
 Bauerleind, J. C., & Norris, L. C., 886  
 Baumann, R., 811  
 Bease, G. L. See Miller, M. W., jt. author, 884.  
 Becker, E. R., & Waters, P. C., 839  
 Beller, K., Schaaf, J., & Schrie, H., 838  
 Berger, H. C., L. E., 911  
 Bernheim, F., & Bernheim, M. I. C., 883.  
 Bernheim, M. I. C. See Bernheim, F., jt. author, 883.  
 Bernkopf, H. See Khiglet, I. J., jt. author, 840, 850  
 Bienn Rep. Nev. Dep. Agric. 1936-38, 915  
 Burkland, J. M. See Finkelshten, R., jt. author, 891  
 Blanchard, W. D., 863, *bis*  
 Blas, E. A. See Long, P. H., jt. author, 920.  
 Bohn, J. D., 888  
 Bohstedt, G. See Fargo, J. M., et al., jt. authors, 896  
 Bol pec, Labou, 887  
 Bone, T., 910  
 Boselli, A. See Vichthaler, R. W., jt. author, 894  
 Boss, H., 890.  
 Boss, W. See Modes, F., et al., jt. authors, 868  
 van den Branden, F., 893, *tes*, 894.  
 —, & Pottier, R., 894  
 Brit. med. J., 862  
 Brown, H. E. See Smith, D. J. W., et al., jt. authors, 854  
 Brown, R. M. See Pyle, N. J., jt. author, 832  
 Bruner, D. W. See Edwards, P. R., jt. author, 827  
 Bulise, W., 902.  
 Bull. Off. internat. Epiz., 817  
 Bull. Serv. zootech. Epiz. A. O. F., 912.  
 Burdon, K. J., 916  
 Burnet, E. & Balozet, L., 839, *ba*  
 Burnet, F. M., & Freeman, M., 853.  
 Buxton, J. B., & Glover, R. E., 864.  
 Buzna, D., 825  
 Cabot, D. A. E., 863  
 Callot, J. See Coutelen, F., et al., jt. authors, 860  
 Calvery, H. O. See Finney, L. L., jt. author, 899.  
 Campbell, R. M. See Tombleson, J. B. L., jt. author, 822  
 Canetti, G. See Saenz, A., jt. author, 820.  
 Carne, H. O. See MacKay, E. M., et al., jt. authors, 884.  
 Caskey, C. D., & Norris, L. C., 882.  
 Caspersen, J., 825.  
 Castelo, M., & Salsamendi, R. C., 827.  
 Cawston, F. G., 859.  
 Chadha, S. R., 851.  
 Chakravarty, G. K., 862.  
 Charnot, A. See Velu, H., jt. author, 896.  
 Clarke, M. K. See van Rockel, H., jt. author, 848.  
 Clay, H. H., 919.  
 Cochet, G. See Coutelen, F., et al., jt. authors, 860  
 Colas-Belecour, J. See Roubaud, E., et al., jt. authors, 841  
 Cole, R. K., 803  
 de Cooman, E. See de Waele, A., jt. author, 860  
 Corner, H. H., & Smith, A. M., 882.  
 Cosgrove, K. W. See Day, P. L., et al., jt. authors, 887.  
 Coste, E. See Zottner, G., jt. author, 855.  
 Coutelen, F. Callot, J., & Desportes, C., 860.  
 —, Lecruart, D., & Cochet, G., 860  
 Cowen, D. See Wolf, A., et al., jt. authors, 841  
 Culbertson, J. T., 836, *ba*  
 Curasson, G., 833, 912  
 Dambovicanu, A., & Dorin, E., 821  
 Dance, D. A., & Murray, T. J., 814  
 Dann, W. J., 886  
 Darby, W. J. See Day, P. L., et al., jt. authors, 887  
 David, R. See Gugaraki, L., jt. author, 834  
 Davies, W. L., 918  
 Day, P. L., Darby, W. J., & Cosgrove, K. W., 887  
 Delbos, J. See Rochaux, A., jt. author, 846  
 Delidimitrou, G., 893  
 Derrick, E. H., 854  
 —. See also Smith, D. J. W., et al., jt. authors, 854  
 Desportes, C. See Coutelen, F., et al., jt. authors, 860  
 Diakon, F. A. See Hykts, O. V., jt. author, 898  
 Dierckx, K., 828  
 Dikmans, G., 862  
 Div. Rep. Dep. Agric. Brit. Guiana, 1937, 910.  
 Djaenedin, R. See Kraneveld, F. C., jt. author, 823  
 Donaten, A., & Lestoquard, F., 813, 867  
 Dorn, E. See Dambovicanu, A., jt. author, 821  
 Doten, S. B., Fleming, C. E., & Vawter, L. R., 855  
 Doyle, T. M. See Kelland, J., et al., jt. authors, 818  
 Duffau, E., 831  
 Earle, W. B., 915  
 Edwards, P. R., & Bruner, D. W., 827  
 Eestri loomaarsti Ring, 910  
 Ehlers, 896.  
 Elkan, E. R., 902.  
 Elpat'evskii, V. S., 856  
 Emmel, M. W., 858  
 Endrejat, E., 894  
 Emgek, K. See Wetzel, R., jt. author, 861, 862  
 Erler, 873.  
 Eskridge, L. See Hegner, R., jt. author, 839  
 Eveleth, D. E. See Millen, T. W., jt. author, 870.  
 Fargo, J. M., Bohstedt, G., Phillips, P. H., & Hart, E. B., 896  
 Fmg S. Afr., 907.  
 Farquharson, J., 847  
 Findlay, G. M., & MacCallum, F. O., 870, *ba*  
 Finkelshten, R., & Burkland, J. M., 891.  
 Finney, L. L., & Calvery, H. O., 899  
 Fleming, C. E. See Doten, S. B., et al., jt. authors, 855.  
 Fooy, J. P., 875.  
 Fort, & Zottner, 830, *bis*.  
 Foster, A. O., & Ortiz, P. O., 861  
 Frank, L. C. See Fuchs, A. W., jt. author, 887  
 Franke, K. W., & Painter, E. P., 899.  
 Franklin, C. E. See Morris, M. L., jt. author, 886.  
 Freeman, M. See Burnet, F. M., jt. author, 853.  
 Fritzsche, K., 876.  
 Froed, J. L. See Kelland, J., et al., jt. authors, 818.  
 Fuchs, A. W., & Frank, L. C., 887.  
 Gambles, R. M., 854.  
 Gard, S., 825, *bis*.  
 Gelz, H. J., 832.  
 Gemetro, L., 837.  
 Gerlach, F., 844.  
 Gibbons, W. J., & Baker, D. W., 839  
 Gilmore, H. D., 849.  
 Giroud, P., & Panther, R., 843.  
 Glover, R. E. See Buxton, J. B., jt. author, 864  
 Goetsch, M., Loustem, I., & Hutchinson, J., 883  
 Goldstem, F. See Maxwell, R. D., jt. author, 841  
 Great Britain. Rep. Lister Inst. 1938, 905  
 —. Rep. Lister Inst. 1939, 906  
 —. Rep. Med. Res. Coun. 1937-38, 904  
 Green, D. F., Allison, J. B., & Morris, M. L., 891  
 Greene, H. S. N., & Saxton, J. A., Jr., 879.  
 Greener, A. W., 815.  
 Greenlee, C. W., 881.  
 Greenwood, M., Hill, A. B., Topley, W. W. C., & Wilson, J. B., 867  
 Grieder, H., 870  
 Gugaraki, L., & David, R., 834.  
 Groen, J., 884  
 Grosse, G. See Weiser, I., et al., jt. authors, 868  
 Grubb, T. C. See Shaugnessy, H. J., jt. author, 888.  
 Guelin, A. See Poverski, E., jt. author, 833  
 Guerrero, R. P., 857, 868  
 Habernoll, A., 904  
 Hadley, P. B., 916  
 Haider, A., 819  
 Hall, M. C., 864  
 Hamilton, B., & Highman, W. J., Jr., 882.  
 Hancock, R. C. G., 893  
 Hardy, D. E. See Knowlton, G. F., et al., jt. authors, 856  
 Harmsdon, F. C. See Knowlton, G. F., et al., jt. authors, 856  
 Hart, E. B. See Fargo, J. M., et al., jt. authors, 896  
 Hart, L., 835  
 Harwood, P. D., 860.  
 Haupt, H., 868.  
 Head, C., 870.  
 Hegner, R., & Alcatraz, J. E., 838  
 —, & Eskridge, L., 839.  
 Heinen, A., 830  
 Henningsen, J. See Kauffmann, F., jt. author, 825.  
 Henry, C., 811, 842.  
 Herber, E. C., 859.  
 Hermanson, K. A., 817.  
 Hewitt, R., 839.  
 Hezel, E., 828.  
 Highman, W. J., Jr. See Hamilton, B., jt. author, 882.  
 Hill, A. B. See Greenwood, M., et al., jt. authors, 867.  
 Hill, W. See Modes, E., et al., jt. authors, 868  
 Hoare, C. A., 838.  
 Helzle, E., 901.  
 Hogue, M. J., 838.  
 Holsten, E. See Lafaye, et al., jt. authors, 835.  
 Honcker, 845  
 Hoppe, R., 830.  
 Hossensfelder, F., 866.

# Index

- Hruška, K., 816.  
Huddleson, I. F. See Meyer, D. B., *jt.* author, 865.  
— See also Pennell, R. B., *jt.* author, 866.  
Hutchinson, J. J. See Goettsch, M., et al., *jt.* authors, 883.  
Hutton, L. R., 910.  
Hykeš, O. V., & Duakov, F. A., 808.  
Imai, N. See Nakamura, J., *jt.* author, 852.  
India Rep., *Imp Coun agric Res* 1937-38, 907.  
Inglez, A., 860.  
James, S. P., & Tate, P., 840.  
Jankauskas, S., 912.  
Jansen, J., 828, 891, 911.  
Jarmai, K., 877.  
Jauffret, R., 836.  
Jespersen, K. W., 822.  
Jezewski, A., 819.  
Jørgensen, K. L., 821.  
Jost, J., 845.  
J. Amer. vet med Ass., 869.  
Kasth, P., & Saxer, E., 829.  
Kammel, O., 844.  
Karlsen, A. G., & McNutt, S. H., 866.  
Kaufmann, J., & Henningsen, F. J., 825.  
Kauts, R. L., 860.  
Keerd, M. See Kipper, A., *jt.* author, 878.  
Kjelland, J., Froot, J. L., & Doyle, T. M., 818.  
Keri, W. R. See Lamoy, H. G., *jt.* author, 849.  
Kidd, J. G., 853.  
King, W. V., & Lenett, I. G., 856.  
Kipper, A., & Keerd, M., 878.  
Kligler, I. J., & Bernkopf, H., 810, 850.  
Knowlton, G. F., Harmsen, F. C., & Harvis, D. F., 856.  
Kobc, K. See Waldmann, O., *jt.* author, 848.  
Kotzschke, J., Wauer, H., Steger, G., & Krenkel, K., 868.  
de Koning, K., 891.  
Kral, F., 854.  
Kraeveld, F. C., & Djaenodin, R., 824.  
Krenkel, K. See Kotzschke, J., et al., *jt.* authors, 868.  
Kizywanek, F. W. See Scheunert, A., et al., *jt.* authors, 917.  
Kucel, I., 871.  
Kuscher, A., 900.  
Labelle, G., 891.  
Lafaye, Saunie, & Holstein, 835.  
Lagodskv, H. See Lamoy, H. G., *jt.* author, 895.  
Lamoy, H. G., & Keri, W. R., 849.  
Lancet, 821, 825.  
Landsberg, J. W., 900.  
Lanfranchi, A., 844.  
Langer, H. See With, D., *jt.* author, 860.  
Lanoy, L., & Lagodskv, H., 865.  
Leclainche, E., 903.  
Lecroart, D. See Coutelen, F., et al., *jt.* authors, 860.  
Lee, J. See Thatcher, H. S., et al., *jt.* authors, 884.  
Lehmke, H., 896.  
Lemay, P., 920.  
Lenett, I. G. See King, W. V., *jt.* author, 856.  
Lestoquard, F., 903.  
— See also Donatien, A., *jt.* author, 843, 867.  
Levaditi, C., & Reimé, L., 852.  
—, Stamatrin, L., Reimé, L., & Le-Van-Sen, 852.  
Le-Van-Sen See Levaditi, C., et al., *jt.* authors, 852.  
de Lion, W. See Africa, C. M., *jt.* author, 859.  
Lisbonne, M., 830.  
—, & Romain, G., 831.  
Long, P. H., & Bliss, E. A., 920.  
Lorenzen, P. See Schoop, G., *jt.* author, 899.  
Loustein, I. See Goettsch, M., et al., *jt.* authors, 883.  
Luchmann, H. See Modes, E., et al., *jt.* authors, 868.  
Luyken, P., 813.  
Lyon, B. M., 846.  
MacCallum, F. O. See Findlay, G. M., *jt.* author, 870, *bis*.  
Machado, A. de M., 828.  
Machle, W., Scott, E. W., & Tricon, J., 896.  
McIntosh, J., & Whithy, L. F. H., 893.  
MacKay, E. M., Carne, H. O., & Wick, A. N., 894.  
McKay, W. M., 819.  
MacLeod, J., 865.  
McNutt, S. H. See Karlsen, A. G., *jt.* author, 866.  
Magrath, B. G., & Vollum, R. L., 891.  
Magnusson, K. E., 825.  
Malbrant, R., & Rapin, L., 811.  
Manninger, R., 823.  
Manwell, R. D., 840.  
—, & Goldstein, F., 841.  
Marbach, H., 829.  
Marsh, H., 871.  
Martin, L. C., 901.  
Martin, R., 857.  
Mastrofrancisco, N., & Ramo, H. R., 819.  
— See also Mello, A., *jt.* author, 888.  
Maternowska, J., 858, 889.  
Maternowska, J. See Maternowska, J. Mathis, M. See Roubaud, E., et al., *jt.* authors, 811.  
Mello, A., & Mastrofrancisco, N., 888.  
Meyer, D. B., & Huddleson, I. J., 865.  
Miegeville, J., & Zottner, G., 868.  
Miesner, H., 823.  
Mittler, D. J., 840.  
Mitten, T. W., & Eveleth, D. F., 870.  
Mittler, M. W., & Boarse, G. E., 884.  
Munk, See Schulze, H., et al., *jt.* authors, 808.  
Mintschew, P., 872.  
Mirbahar, K., 815.  
von Moeszy, J., 848.  
Modes, E., Hill, W., Luchmann, H., & Bosse, W., 868.  
Moune, G., 824.  
Moldenhauer, W., 815.  
Morgulis, S., 883.  
Morris, M. L., & Franklin, C. E., 886.  
— See also Green, D. P., et al., *jt.* authors, 891.  
de Moulou, F., 816, *bis*.  
Müller, E., 873.  
Murray, T. J. See Dance, D. A., *jt.* author, 814.  
Nakamura, J., & Imai, N., 852.  
Nakata, K., 861.  
Negri, R., 846.  
Nehm, M., 865.  
Nemes Mihaly, S., 819.  
Nickel, R., 879.  
Nórr, J., 874.  
Norris, J. C. See Bauernfeind, J. C., *jt.* author, 886.  
— See also Caskey, C. D., *jt.* author, 882.  
Northrop, J. H., 918.  
Noury, M., 850, *bis*.  
Numata, G., 867.  
Oag, R. K. See Anderson, C. G., *jt.* author, 880.  
Oberender, K., 816.  
Olafsson, A., 861.  
Orskov, J., 867.  
Ortiz, P. O. See Foster, A. O., *jt.* author, 861.  
Osteeen, O. W., 847.  
Ostertag, H., 879.  
von Ostertag, R., 889.  
Ott, G. L., 851.  
Otto, 898.  
Pade, H., 891.  
Page B. See Wolf, A., et al., *jt.* authors, 841.  
Painter, E. P. See Franke, K. W., *jt.* author, 890.  
Pallaske, G., & Volkmann, A., 838.  
Panther, R. See Giroud, P., *jt.* author, 843.  
Parker, J. M. See White, H. J., *jt.* author, 891.  
Parree, W., 900.  
Parschau, J., 829.  
Patton, J. W., 885.  
Pennell, R. B., & Huddleson, I. F., 866.  
Peragallo, I., 846, 849.  
Phillips, P. H. See Fargio, J. M., et al., *jt.* authors, 896.  
Potel, K., 876.  
Pottier, R. See van den Branden, F., *jt.* author, 894.  
Pozzetti, E., & Guelin, A., 833.  
Proc natl Conf Nutrition, 881.  
Proper, S. A., 871.  
Provost, A. See Roubaud, E., *jt.* author, 836, 837.  
Puntoni, V., 833.  
Pyle, N. J., & Brown, R. M., 852.  
Quin, A. H., 881.  
Radtke, G., 873, 874.  
Ramo, H. R. See Mastrofrancisco, N., *jt.* author, 819.  
Randall, R., 847.  
Rappin, L. See Malbrant, R., *jt.* author, 841.  
Reveur, M., 846.  
Redaelli, P., 833.  
Reimé, L. See Levaditi, C., *jt.* author, 852.  
— See also Levaditi, C., et al., *jt.* authors, 852.  
Remlinger, P., & Bailly, J., 850, *bis*.  
Rommel, E., 818.  
Rep. Dep Agric. Gambia, 1937-38, 910.  
Rep. Dep Agric. Nyasaland, 1937, 909.  
Rep. Dep Agric. Zanzibar, 1938, 909.  
Rep. Minist. Agric. Eire, 1937-38, 906.  
Rep. Storm-agric. Exp. Sta., 1936-37, 915.  
Repos. Lab. Pat. vet., Lisboa, 912.  
Refabek, J., 837.  
Rev. Med. vet., B. Aires, 857.  
de Rio-Hortega, P., 900.  
Rivollier, P. See Rochaix, A., *jt.* author, 815.  
Robertson, D., 854.  
Rochaix, A., & Delbos, J., 846.  
—, & Rivollier, P., 815.  
Rohrer, H., 845.  
van Rockel, H., & Clarke, M. K., 848.  
Rommelshut, G., 813.  
Roman, G. See Lasbonne, M., *jt.* author, 831.  
Romana, C. See Acosta, J. L., *jt.* author, 837.  
Rosenthal, S. R., 820.  
Roubaud, E., & Colas-Belcour, J., & Mathis, M., 841.  
—, & Provost, A., 836, 837.  
Rudau, J., 874.  
Runge, W., 901.  
Saar, W., 878.  
Sabun, A. B., 842.  
van Saeghem, R., 893.  
Saenz, A., & Canetti, G., 820.  
Salhoff, S., 835.  
Sallinger, 845.  
Salomon, L., 879.  
Salsamendi, R. C. See Castelo, M., *jt.* author, 827.  
Sannier, A., 896.  
Saunie, 824.  
— See also Lafaye, et al., *jt.* authors, 835.

## Index

- Sawitz, W., 801.  
 Saxer, E., 824.  
 —. See also Kästli, P., jt. author, 829.  
 Saxton, J. A., Jr. See Greene, H. S. N., jt. author, 879.  
 Schaaf, J. See Bellei, K., et al., jt. authors, 838.  
 Schäfer, R. See Schulze, H., et al., jt. authors, 868.  
 Schäper, W., 878.  
 Scherle, H. See Bellei, K., et al., jt. authors, 838.  
 Scheunert, A., Trautmann, A., & Krzywanek, F. W., 917.  
 Schürmeister, E., 901.  
 Schoenaers, F., 858.  
 Schoop, G., & Lorenzen, P., 889.  
 Schüffner, W. See Walch-Sordrager, B., jt. author, 843.  
 Schulz, H., zu Bargholz, M., Münck, & Schäfer, R., 868.  
 Schulz, J. A., 897.  
 Scott, E. W. See Machie, W., et al., jt. authors, 896.  
 Shanks, P. L., 822, 824.  
 Shaughnessy, H. J., & Grubb, T. C., 888.  
 Sikkut, M., 910.  
 Sjöberg, K., 870.  
 Smith, A. M. See Corner, H. H., jt. author, 882.  
 Smith, D. J. W., Brown, H. E., & Derrick, F. H., 854.  
 Smythe, R. H., 863.  
 Snyder, F. F., 902.  
 Soutar, J. J. M. See Todd, A. G., jt. author, 872.  
 Stamatin, L. See Levaditi, C., et al., jt. authors, 852.  
 State Planning Board, S. Dakota, 898.  
 Stefański, W., 855.  
 Steger, G. See Köttschke, J., et al., jt. authors, 868.  
 Stenert, H., 827.  
 Stengel, 859.  
 Stenius, P. I., 860.  
 Strube, G., 818.  
 Sugai, T., 866.  
 Sure, H. See Thatcher, H. S., et al., jt. authors, 884.  
 Suzuki, C., 820.  
 Sybesma, R. P., 851.  
 Tate, P. See James, S. P., jt. author, 840.  
 Tcherv, J., 917.  
 Thatcher, H. S., Sure, B., & Lee, J., 884.  
 Thévenot, L. See Ailong, P., et al., jt. authors, 820.  
 Tijdschr. Diergeneesk., 911.  
 Tillett, W. S., 814.  
 Timofeeff, P. See Yakimoff, W., jt. author, 839, *bs*.  
 Tobler, J., 869.  
 Todd, A. G., & Soutar, J. J. M., 872.  
 du Toit, P. J., 907.  
 Toman, R. V., 876.  
 Tomblason, J. B. L., & Campbell, R. M., 822.  
 Tomlin, E., 822.  
 Topley, W. W. C. See Greenwood, M., et al., jt. authors, 867.  
 Trautmann, A. See Scheunert, A., et al., jt. authors, 917.  
 Treon, J. See Machie, W., et al., jt. authors, 896.  
 Tunncliff, R., 893.  
 Udall, D. H., 813.  
 U.S.A. Rep. Agric. Exp. Sta., 913.  
 Univ. Illinois, 874.  
 Unna, K., 886.  
 Vawter, L. R. See Doten, S. B., et al., jt. authors, 855.  
 Veenbaas, A. H., 911.  
 Velu, H., & Charnot, A., 896.  
 Vet. Bull. U.S. Army, 847.  
 Viallier, J. See Arlong, P., et al., jt. authors, 820.  
 Vianello, G., 898.  
 Vierthaler, R. W., & Boselli, A., 891.  
 Volkmann, A. See Pallasko, G., jt. author, 838.  
 Vollum, R. L. See Maegraith, B. G., jt. author, 891.  
 de Waale, A., & de Cooman, E., 890.  
 Wagener, K., 845.  
 Walch-Sordrager, B., & Schüffner, W., 843.  
 Waldmann, O., & Köbe, K., 848.  
 Warren, D. C., 877.  
 Waters, P. C. See Becker, E. R., jt. author, 839.  
 Wauer, H., 868.  
 —. See also Köttschke, J., et al., jt. authors, 868.  
 Wehser, E., Grosse, G., & Wiegand, H., 868.  
 Weidenmüller, H., 900.  
 Welcker, A., 844.  
 Westhues, M., 873.  
 Wetzel, R., & Enigk, K., 861, 862.  
 Whitby, L. E. H. See McIntosh, J., jt. author, 893.  
 White, H. J., & Parker, J. M., 891.  
 Whitlock, S. C., 862.  
 Wick, A. N. See MacKay, E. M., et al., jt. authors, 884.  
 Wiegand, H. See Wehser, E., et al., jt. authors, 868.  
 Wilson, J. See Greenwood, M., et al., jt. authors, 867.  
 Wirth, D., & Langer, H., 895.  
 Wittenberg, G., 893.  
 Wittfogel, H., 848.  
 Wittigmann, J., 832.  
 Wolf, A., Cowen, D., & Paige, B., 841.  
 Wolf, J., 845.  
 Wolfson, F., 839.  
 Yakimoff, W., & Timofeeff, P., 839, *bs*.  
 Zottner. See Fort, jt. author, 830, *bs*.  
 Zottner, G., & Coste, E., 855.  
 —. See also Miegéville, J., jt. author, 868.  
 Zottner, M., 828.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

## INDEX VETERINARIUS.

See notice on page 4 of cover.

# IMPERIAL BUREAU OF ANIMAL HEALTH

## THE VETERINARY BULLETIN

---

---

Vol. 9.]

January, 1939.

[No. 1

---

---

### DISEASES CAUSED BY BACTERIA AND FUNGI

CHAPMAN, G. H., BERENS, C., NILSON, Edith L., & CURCIO, Lillian G. (1938).  
**The Differentiation of Pathogenic Staphylococci from Non-Pathogenic Types.**—*J. Bact.* 35. 311-334. 2 figs., 8 tables. [Numerous refs.]

The pathogenicity of 400 staphylococcal strains from various sources was compared by rabbit inoculation and certain *in vitro* tests. The coagulase test with human or rabbit plasma was most reliable for the differentiation of pathogenic from non-pathogenic strains. The degree of pathogenicity was best estimated by haemolysis of rabbit-blood-agar, together with pigment and coagulase tests.

—R. O. MUIR.

POCHON, J. (1938). Recherches immunochimiques sur la bactériologie charbonneuse encapsulée et sur une souche non-encapsulée d'*anthracoides*. [**Immuno-Chemical Investigations on Capsulated Strain of *Bacillus anthracis* and on a Non-Capsulated Strain of *B. anthracoides***].—*C. R. Soc. Biol. Paris.* 127. 1185-1187. [2 refs.]

P. analysed culture filtrates of capsulated anthrax and non-capsulated anthracoid strains with regard to nucleoprotein, somatic and capsular substances. The somatic antigens of virulent, attenuated and avirulent anthrax strains were identical, but there was a slight immunological difference between the nucleoproteins of capsulated anthrax strains and anthracoid strains.—R. O. MUIR.

I. BOQUET, A., & SAENZ, A. (1934). Infection charbonneuse et essais de vaccination du cobaye et de la souris par voie sous-cutanée. [**Subcutaneous Vaccination of Guinea Pigs and Mice against Anthrax**].—*Mem. Prof. Jean Cantacuzène.* pp. 47-57. [15 refs.] Paris: Masson et Cie.

- II. COMBIESCO, D., STAMATESCO, & AUBERT. (1934). Sur la dissociation d'une souche de bactérie charbonneuse. [*Dissociation of a Strain of Bacillus anthracis*].—*Ibid.* pp. 197-206. [6 refs.] Paris: Masson et Cie.
- III. ROBYN, G. (1937). Comportement de deux races de *B. anthracis* entretenues depuis plusieurs années sur gélose oxalatee. [*The Behaviour of Two Strains of B.a. Maintained for Several Years on Oxalated Agar Medium*].—*C. R. Soc. Biol. Paris.* 126. 938-939. [1 ref.]
- IV. ROBYN, G. (1937). Comportement comparé du cobaye et de la souris vis-à-vis d'une race atténuée de *B. anthracis*. [*The Reaction of Guinea Pigs and Mice to an Attenuated Strain of B.a.*].—*Ibid.* 940-942. [8 refs.]

I. The authors assessed the rate of dispersal of anthrax bacilli from injection sites (tip of tail in mice and into the skin of the flank in g. pigs) by amputation of the tail in the mice and excising the skin around the zone of diffusion in g. pigs at varying intervals. For similar reasons they injected the plantar pads of g. pigs, bled the animals to death at varying intervals by heart puncture and tested the blood, the spleen and the popliteal lymph node of the inoculated leg by injections into mice. They conclude that invasion by the blood stream precedes by several hours that by the lymphatics, but that the gravity of the disease depends more on an early massive invasion of the internal organs than on the local reaction to the injection.

The authors show that compared with the skin the subcutaneous tissues of g. pigs can withstand 2-5 times the number of spores of Pasteur's second vaccine, and that there is an absence of the skin necrosis and haemorrhagic lesions which occur after intradermal inoculation.

They review previous attempts at anthrax vaccination of laboratory animals, and show by their experiments that immunity results from a gradual tolerance on the part of g. pigs and mice to an increasing number of anthrax bacilli, and depends on the method of inoculation and on the intervals between the several inoculations. The subcutaneous route was found most satisfactory, and a region least sensitive to the inoculations should be chosen for each species of animal.

II. The authors used a type R strain of *B.a.* isolated from a pig, and of high virulence. No S variants had been noted during ten years of sub-culture and laboratory experimentation. They succeeded in causing rapid dissociation of this strain into S variants by using media containing arsenic. These variants required sub-culture every eight days for conservation, but their virulence for mice decreased gradually to a low degree during this process. Several dissociation experiments with the R and S types are detailed.

Finally the authors show that vaccination of rabbits by intradermal or subcutaneous inoculations with S variants protected them against R strains.

III. R. maintained two strains of *B.a.* on agar to which 25 drops of a 1% solution of calcium oxalate had been added per tube. Type A was fully virulent for g. pigs, and sporulating. Type AA was derived from type A by sub-culture on agar to which 5 drops of calcium chloride had been added per tube; it was avirulent for g. pigs, appearing in the form of non-sporulating, very thin filaments.

The characters of type A were fully maintained after seven years of sub-culture. Type AA remained avirulent, but regained some of its sporulating power, the spores being small and very polymorphological.

Media therefore influenced the virulence and morphology of *B.a.* strains. Gradual lessening of virulence of *B.a.* on ordinary agar appears to be due to free calcium ions in this medium.

IV. Injection (subcut.) of strain AA referred to in III was found to be lethal for mice within 2-4 days without causing any oedema. P.M. examination showed

congested liver, a dark, swollen spleen, peritoneal hyperaemia, and sometimes congestion of the lungs. Encapsulated bacteria were numerous in the organs and heart blood.

R. found that peritoneal fluid of g. pigs was lytic for this strain of *B.a.*, whereas mouse fluid was not.

The reactions of g. pigs and mice to large injections (intraperit.) are tabulated. All the animals died. Death of the g. pigs was evidently due to intoxication by the bacillary capsular substance in the peritoneal cavity, while the mice died of a bacteraemia leading to a similar intoxication, but brought about by distribution of the capsular substance (on the bacteria) throughout the body.—C. V. WATKINS.

SELTNER, H., & SCHÜRMANN, E. (1937). Das Vorkommen von Tuberkelbacillen in gesunden Organen und seine Bedeutung für die Fleischschau. [**The Occurrence of Tubercle Bacilli in Healthy Organs and the Importance of this Fact in Meat Inspection**].—*Z. Hyg. InfektKr.* **119**. 617-622. [9 refs.]

In order to determine whether tubercle bacilli are to be found in the apparently normal organs of animals showing localized TB. at meat inspection, the authors prepared cultures (on Petragnani's medium) from suspensions of tissue taken from macroscopically lesion-free lungs, livers, spleens and kidneys of a total of 22 cattle and pigs with localized and established (not early) TB. lesions in one or other of these organs. Sections were also made for microscopical examination. Five cultures of acid-fast organisms developed, and were typed by Petragnani's culture method; by this test one was bovine, three were human and one was of an undetermined type of tubercle bacillus. On animal inoculation all were non-pathogenic.

The authors draw attention to this error of the cultural method and condemn its use in diagnosis, agreeing with GRIFFITH (1935) and with JENSEN [both in *Quart. Bull. Hlth. Org. L.o.N.* **4**. 866 and 869.] that much of Löwenstein's blood culture results are fallacious.—J. E.

I. ZIEGLER, M. (1937). Weitere Untersuchungen über das Zellbild der Milch bei tuberkulöser Mastitis. III. Mitteilung. [**The Cell Content of Milk in Tuberculous Mastitis. III**].—*Z. InfektKr. Haustiere.* **51**. 176-184. 4 figs. [See also *V. B.* **5**. 648].

II. PALLASKE, G. (1938). Verwendung eines Milchzentrifugatschnittverfahrens zur Diagnose der Eutertuberkulose. [**Diagnosis of Udder TB. by Microscopic Examination of Sections Cut from Milk Centrifuge Deposit**].—*Z. Fleisch- u. Milchhyg.* **48**. 201-207. 3 figs., 2 tables.

I. Z. considers that a search for epithelioid cell groups and for giant cells is of great value in the diagnosis of TB. of the bovine udder, firstly because it may facilitate considerably the finding of tubercle bacilli, and secondly because, if acid-fast bacilli and typical cells are found, errors in positive diagnosis are unlikely. He recommends that films should be prepared according to the method put forward by Cowan and Maddocks, and that a preliminary search should be made for acid-fast bacilli. If these are not quickly found, a search should be made for cell groups, particularly at the edge of the slides. If cell groups are found, further search must then be made for tubercle bacilli, which are then usually easy to find. The combination of a search for cell groups and acid-fast bacilli will, however, not detect all cases even when clinically suspected.

Z. reports the finding of typical cell groups in 313 out of 861 cases (36%) in which tubercle bacilli were also found at the time, and in 218 cases in which they were found later.

11. P. agrees with ZIEGLER [p. 8] and KUHLMANN [V. B. 7. 4.] in attaching considerable importance to a cytological examination of milk as an aid to the diagnosis of udder TB. He describes methods involving the embedding of centrifuge deposit in gelatin or paraffin and the examinations of serial sections. He claims that a clearer picture is obtained and states that, from a comparison of the results of the examination of films, sections and g. pig inoculation on 64 samples of milk, the section method was slightly better than the film method. There was, however, agreement in most cases, viz, in 33 cases all three methods gave positive results, and in 22 cases all were negative.—A. W. STABLEFORTH.

CIUCA, A. (1934). Une enzootie de tuberculose ovine en Roumanie. Valeur diagnostique des réactions à la tuberculine chez le mouton. Caractères anatomo-pathologiques des lésions. [Ovine TB. in Rumania. Value of Tuberculin Tests on Sheep. Pathological Characters of the Lesions].—*Mém. Prof. Jean Cantacuzène*. pp. 185-196. [2 refs.] Paris: Masson et Cie.

After a short review of the literature on ovine TB. to illustrate the rarity of the disease, C. describes an outbreak with high mortality amongst both ewes and lambs. In his opinion, sheep are very receptive to natural TB. under special conditions of exposure, such as in the present case where dairy residue was fed to them. He considers that infection of sheep by direct contact, if not impossible, is at least exceptional under natural living conditions. This statement he bases on his findings with 20 lambs which remained uninfected in spite of prolonged contact with infected animals, on the scarcity of bacilli in the lesions, and on the abattoir statistics of every country. That sheep possess a certain degree of resistance to natural infection is shown by the limited development and advanced calcification of the lesions.—R. O. MUIR.

URBAIN, A., & DECHAMBRE, E. (1937). Un cas de tuberculose chez un éléphant d'Afrique. [TB. in an African Elephant].—*Bull. Soc. Path. exot* 30. 834-836. [4 refs.]

The authors state that this is the first recorded case of TB. in an African elephant; the animal was in the zoological gardens, Paris. *Ante-mortem* symptoms were absent. Autopsy revealed about 50 litres of serous fluid in the peritoneal cavity. Lardaceous adhesions were observed between the pulmonary and costal pleura. Both lungs showed purulent foci enclosed in fibrous tissue and the left lung contained innumerable pus granules, about the size of a millet seed, scattered throughout the congested tissue. The pus contained numerous tubercle bacilli of undetermined type.—R. O. MUIR.

CUNNINGHAM, O. C., & ADDINGTON, L. H. (1936). Tuberculosis in Milk Goats. —*J. Dairy Sci.* 19. 435.

In a herd of approximately 70 goats at New Mexico Experiment Station, two were found to be tuberculous at the first herd test in 1931, and since 1931, five more goats have reacted to the tuberculin test. On P.M. examination three goats showed pronounced tuberculous lesions and three others minor lesions that may or may not have been tuberculous. [No details concerning the remaining goat].—N. J. S.

PIASECKA-ZEYLAND, E. (1937). Rapport entre la fréquence des bacilles tuberculeux dans les laits du commerce et celle des bacilles du type bovin chez les malades à Poznan (Pologne). [TB. of Bovine Origin in Poland].—*Rev. Hyg. Med. prév.* 59. 540-542. [Abst. from abst. in *Brit. med. J.* Feb. 19th, 1938. p. 32. of Epit. Curr. med. Lit.]

The author cultivated and typed 160 strains of tubercle bacilli from human patients at Poznan affected with various forms of TB. Eleven strains were of the bovine type, two strains coming from abattoir workers with a skin infection. Nine out of 31 samples of milk bought in the open market at Poznan contained tubercle bacilli, but it is considered surprising that the incidence of infection with the bovine type bacilli was not higher, among the patients examined.

VAILLÉE, H. (1938). En marge de la prémunition antituberculeuse. [**Premunition against TB.**]—*Bull. Acad. Méd. Paris*. **119**. 116-122. [11 refs.]

In reviewing his researches on immunization against TB. from 1909 to the present day, V. refers to his methods of vaccination with live bovine tubercle bacilli of low virulence and suspended in an unabsorbable vehicle. He also refers to the results obtained by this method when the bacillus of Johne's disease is used for immunization against that infection [*V. B.* **5**. 601].—R. O. MUIR.

BERG, W. N. (1936). **A Standard Method for Testing Anti-Tuberculosis Vaccines.**—*Tubercle, Lond.* **17**. 502-508. 1 fig. [18 refs.]

B. describes in detail a suggested standard method of carrying out a "longevity test" on g. pigs. He describes the selection of g. pigs of even weight, tested intradermally for TB. and fed on standard rations which do not reduce natural immunity to tuberculosis.

The vaccine is tested for toxicity, and infective and re-infective doses are given to the test animals. An interval of six weeks between the last immunizing injection and the first infective dose is recommended, and the size of the infective dose is suggested. Details of technique at each stage of the method are indicated.—H. B.

COSTIL, L., & BLOCH, F. (1938). Réactions de la membrane chorio-allantoïde de l'embryon de poulet aux bacilles tuberculeux humains et aviaires. [**The Reaction of the Chorio-Allantoic Membrane of the Hen's Egg to Avian and Human Tubercle Bacilli.**]—*C. R. Soc. Biol. Paris*. **128**. 40-42. [2 refs.]

Two human and three avian strains of tubercle bacilli were inoculated into ten-day chick embryos. Histological examination from the third to the tenth day showed a diffuse reaction—chiefly presence of monocytes—persisting throughout embryonic life in the case of the avian strains, but with the human strains becoming localized to macroscopic nodules after the seventh day.—R. O. MUIR.

TAYLOR, J. B. (1937). **Studies on Haemorrhagic Septicemia.**—*J. Amer. vet. med. Ass.* **91**. 182-185. [1 ref.]

Identification of cultures of *Pasteurella bubaliseptica* show that it belongs to Jones' Group III. Production of exotoxin and of endotoxin is described. Toxoid is produced by formalizing the filtrate, precipitation by acetone, redissolving in 0.85% saline and formalizing, tests being made on rabbits. Intravenous injection of solution of sodium bicarbonate or of neoarsphenamine failed to protect rabbits against the lethal effect of injection of cultures. *P.b.*, unlike most pasteurella bacteria, does not lose bipolar characters or pathogenicity after cultivation on artificial media. Toxoid, aggressin and bacterins when tested on rabbits failed to produce sufficient immunity to protect against inoculation with live organisms.—H. BURROW.

ROTT. (1938). Observations sur une épizootie de pleuro-pneumonie bovine. [**An Outbreak of Pleuro-Pneumonia in Cattle, Accompanied by Pasteurella Infection.**]—*Réc. Méd. vét.* **114**. 270-272.

An outbreak [apparently haemorrhagic septicaemia] in which pneumonic lesions were prominent, occurred on one farm in the Department of Charente

Inférieure, France, and then spread to three neighbouring farms, where the disease assumed the pectoral-intestinal form. Stained blood films revealed pasteurella-like organisms, and cultural examination of the drinking water yielded, amongst other organisms, some which had the cultural characters of *Pasteurella*.

Intravenous injections of an aqueous solution of gonacrine gave very good results.—GWILYM O. DAVIES.

WOHLFEIL, T., & BECKER, H. (1937). Ueber Tularämie. [**Tularaemia**].—*Veröff. Volksgesundheitsdienst. Berl.* 50. No. 3. 35-64. 2 tables. [Numerous refs.] Berlin: Richard Schoetz. [8vo] [RM.2.40].

This is an excellent systematic account of tularaemia, with an extensive bibliography. All aspects of the disease are dealt with, both veterinary and medical, so that the essay is of great value as an authoritative reference book.—J. E.

KRUMWIEDE, Elma, & KUTTNER, Ann G. (1938). **A Growth Inhibitory Substance for the Influenza Group of Organisms in the Blood of Various Animal Species. The Use of the Blood of Various Animals as a Selective Medium for the Detection of Hemolytic Streptococci in Throat Cultures.**—*J. exp. Med.* 67. 429-441. 7 tables. [12 refs.]

The authors consider 5% sheep blood agar to be a selective medium for beta-haemolytic streptococci in mixtures with bacillus X (*Haemophilus haemolyticus*), since sheep blood inhibits the growth of the *Haemophilus* group. The inhibitor is shown to reside in the red cells, to be thermolabile and to be unaffected by haemolysis. The blood of animals closely related to the sheep, such as the goat and the cow, similarly inhibits the growth of haemolytic and non-haemolytic members of the influenza group, while human blood contains a similar but less powerful inhibitor for these organisms. The inhibitor in the blood of the various species is destroyed by heating at 68°C. for 30 minutes. Bacteria of the influenza group grow well on unheated rodent blood and fairly well on horse blood. —R. O. MUIR.

DAVIS, C. R. (1938). **Colibacillosis in Young Chicks.**—*J. Amer. vet. med. Ass.* 92. 518-522. 3 tables.

*Bacterium coli commune* was isolated from chicks in four flocks, all obtained from the same hatchery, where conditions were found to be unsatisfactory.

Experimentally, chicks from this hatchery were found to be susceptible to infection by *B.c.c.*, whereas chicks from another hatchery proved completely resistant.

It is concluded that faulty incubation results in lowered vitality in the chicks, and that *B.c.c.* is pathogenic to such chicks.—W. J. IRONSIDE.

DI MARCO, R. (1937). Il metodo di Wulff nella pullorosi sperimentale. [**Viability of *Salmonella pullorum* in Bone-Marrow**].—*Proflassi.* 10. 146-147. [15 refs.]

The author infected pigeons with *S.p.*, and on their death removed long bones and kept them in powdered charcoal. Pigeons were then inoculated with emulsions of the bone-marrow at two-day intervals. The organisms maintained their virulence until the eighth day, but were not infective to pigeons after that interval. Smears made from the marrow after the 14th day did not reveal the presence of *S. pullorum*. [No details of methods used].—J. A. NICHOLSON.

SOUSSOKO, B. (1938). Sur la typhose aviaire à Dakar. [**Fowl Typhoid in Dakar (French West Africa)**].—*Bull. Serv. Zootech. Epiz. A.O.F.* 1. 7-9.

A description of the isolation of *Salmonella gallinarum* from diseased birds in Dakar.—D. L. HUGHES.

GRAHAM, R., BRANDLY, C. A., & DUNLAP, G. L. (1938). **Studies on Duck Septicemia.**—*Cornell Vet.* **28**. 1-6. 3 figs. on 2 plates. [3 refs.]

The disease described occurred in a duck-fattening plant every spring over a period of 4-5 years. It broke out when the eight-week-old ducks were moved from the brooders to the fattening sheds. The total mortality was more than 4,000.

Symptoms such as drowsiness and weakness were rapidly succeeded by diarrhoea and emaciation, death often supervening within 24-48 hours of the onset of symptoms.

On P.M. examination septicaemic lesions such as petechial haemorrhages on the serous membranes of the liver, heart, lungs and mesentery were observed. Fibrinous pericarditis, and congestion of the lungs and kidneys were also noted. In subacute cases there was marked distention of the horny beak with fluid.

A bacterium was consistently isolated in pure culture from the heart blood, spleen, liver, peritoneal cavity and bone-marrow of affected ducks. This organism was a Gram-negative rod, non-motile, non-sporulating and non-haemolytic; it occasionally showed filamentous forms. It failed to ferment carbohydrates and alcohols, and did not produce indol or  $H_2S$ . The authors call the organism *Pfeiferella anatipestifer* owing to its resemblance to the organisms described by HENDRICKSON and HILBERT [*V. B.* **3**. 178].

The disease could be reproduced by the inoculation of ducks with cultures of the organism.—D. L. HUGHES.

- I. GILBERT, S. J. (1937). **A Short Review of Successful Progress in Eradication of Contagious Bovine Abortion in Palestine.**—*J. comp. Path.* **50**. 335-337.
- II. McEWEN, A. D. (1938). **The Control of Contagious Abortion.**—*Vet. Rec.* **50**. 699-712.
- III. McEWEN, A. D. (1938). **The Cost of Controlling Contagious Abortion in a Large Self-Contained Herd.**—*J. Minist. Agric.* **45**. 28-37. 4 tables. [Reprinted in *Vet. Rec.* **50**. 712-717].

I. Importation of cattle into Palestine resulted in spread and increased incidence of bovine brucellosis. The gradual growth of voluntary control and eradication measures are traced. The basis of control is segregation of reactors to the agglutination test, using a heavy final emulsion equal to a 1 : 6,400 suspension of barium sulphate. A titre of 1 : 25 is taken as the positive standard. The complement-fixation test is used as a check. The results have been successful.

Examples of some anomalous results are given. The sudden appearance in a clean herd of a reactor at a titre of 1 : 50 is regarded as of little significance, the animal usually ceasing to react within a year and spreading no infection in the herd.

II. Control methods were based on short-interval aggl. tests, segregation of clean and infected animals, and use of calving-boxes; the latter prevented spread of infection from the cows which failed to react to the aggl. test until some time after parturition. It is recommended that control measures be initiated when the disease in a herd is relatively quiescent. The role of vaccines is discussed, and reference made to the use of Meyer and Huddleson's rough, non-agglutinable, non-virulent strain of *Br.a.* as a source of vaccine [*V. B.* **8**. 77].

The promising results obtained by COTTON, BUCK and SMITH in vaccination of calves with *Br.a.* vaccines of reduced virulence are discussed [*V. B.* **5**. 119 and 196]. Calf-vaccination possesses an advantage in that agglutinins so produced disappear in later life and so do not nullify the application of the aggl. test when the animals become adults.

A general discussion is appended.

III. The author describes how, at a direct total cost of approximately £40, contagious abortion was controlled over a period of six years in a self-contained herd of 180 cows. Control was effected by aggl. tests of the whole herd at intervals of two months for the first six months, followed by tests twice yearly.

After the first 18 months, only one new reactor was revealed. The clean and infected groups of animals were segregated and the reactors were disposed of as soon as economically possible.

The breeding-history of the reactors is tabulated; a table is also given comparing the milk yields of the same cows before and after abortion, and shows an average decrease of 200 gallons in the lactation following abortion.

The simplicity of control of contagious abortion in self-contained herds under ordinary farm conditions is indicated. — H. BURROW.

(1936). **Results of Four Tests of 2,801 Herds Infected with Bang's Disease.**  
—*Cornell Vet.* 26. 357.

The article reports the success of the method of systematic retests and disposal of reactors in the control of brucellosis, giving results for 2,801 herds in five Middle West states. One original test and three retests were made, each owner taking measures to prevent reinfection of his herd.

At the original tests, all herds contained some infected cattle; at retest, 44.2% of herds were free from infection, at the third test, 54.2%, and at the final one, 75.3%; the percentage of the total reactors dropped from 26.7 to 2.7, the number of reactors removed being balanced by additions and replacements.

Four probable causes of infection remaining after the fourth test are given as:—extremely virulent initial infection; carelessness in purchase of replacements; neglect of sanitation, and over-confidence in the health of cows in a heavily infected herd which pass only one negative test.

ITABASHI, K., WATANABE, S., ITO, S., TAJIME, Y., & OTAKI, K. (1937). **Studies on Contagious Abortion in Sheep. II. Epizootiological Observations on Ovine Brucellosis among Sheep at the Paichengtzu Sheep-Farm in Lung-kiang Province, Manchoukuo.**—*J. Jap. Soc. vet. Sci.* 16. 456-476 of pt. 1. 7 tables. [2 refs.] [In Japanese: abst. from English summary pp. 63-65 of pt. 2]. [See also *V. B.* 8. 136].

WATANABE, S., TAJIMA, Y., ITO, S., ITABASHI, K., & YODA, H. (1937). **Studies on Contagious Abortion of Sheep. III. Outbreak of Brucella Abortion among Sheep at the Linsi Sheep-Farm and its Prevention by Vaccination with Lanolin-Live Vaccine.**—*Ibid.* 477-493 of pt. 1. 11 tables. [5 refs.] [In Japanese: abst. from English summary pp. 66-68 of pt. 2].

II. Bacteriological examination of 33 aborted foetuses from a sheep farm where undulant fever prevailed amongst the farm-workers revealed *Br. melitensis* as the cause of infection. The organism was also isolated by cultivation from the vaginal mucus and milk of several ewes about three weeks after abortion. Serological examination of the blood of 84 ewes that aborted proved positive by agglutination and complement-fixation in 29 cases. Sera of 69 rams all showed a negative reaction.

III. Vaccination of 1,640 sheep, 2-3 months before mating, with lanoline-live vaccine, is claimed to have reduced the abortion incidence from 19% to 6.4%. Losses sustained after vaccination were investigated and bacteriological work was done on some of the cases, *Br.m.* being detected in 24 out of 30 aborted foetuses,

as well as in the after-birth of a ewe which delivered normally. Some deaths in young lambs were also found to be associated with the infection, being more numerous in the progeny of ewes strongly positive serologically, than in those of negative reactors. The great majority of aborting ewes delivered normally the following year.—R. O. MUIR.

BOSWORTH, T. J. (1937). **The Susceptibility of the Wild Rat to Infection with *Brucella abortus*: A Preliminary Note.**—*J. comp. Path.* 50. 345-349. [3 refs.]

B. infected 13 out of 21 rats caught on brucella-free premises, by feeding ground-up spleen of *Br.a.*-infected g. pigs on one or on successive days. Most of the rats had been tested previously for brucella agglutinins in serum dilutions of 1:10 and upwards, with negative results. Later, serum tests showed that many of the rats became infected without obvious disturbance of their health. Large doses ( $5 \times 10^7$ ) of living organisms injected intraperitoneally also caused no ill effects in wild rats. Apart from slight enlargement of the spleen, no gross lesions of disease were observed in rats killed at varying intervals after injection.

The tissues of rats from which cultures of *Br.a.* were obtained included heart blood, spleen, liver, pharyngeal and mesenteric lymph nodes, epididymis and kidney. Cultures were obtained from the urine, but not from the faeces. These cultural findings suggested distribution by the lymph stream and later by the blood, and excretion through the kidneys.

Infection by passage from rat to rat in close contact was proved in three out of eight experiments.—C. V. WATKINS.

GHINELLI, I. (1938). L'infezione brucellare nei Piccioni in avitaminosi. [**Brucellosis in Avitaminotic Pigeons**].—*Nuova Vet.* 16. 156-161. 3 tables.

G. was unable to increase the susceptibility of pigeons to brucella infection by keeping them for some months on a diet deficient in vitamin B complex. The virulence of the organism remained unchanged for g. pigs after repeated passage through pigeons affected with avitaminosis. After inoculation a few pigeons showed a rise of temperature and an agglutination titre of 1:1,000, but P.M. examination of such birds did not reveal lesions of brucella infection. It is concluded that birds [sic] are highly resistant to a natural brucella infection.—J. A. N.

MILLENBRUCK, E. L. (1938). **The Control and Eradication of Infectious Abortion in Swine.**—*Vet. Bull. U.S. Army.* 32. 137-141.

It was suspected that contact with infected pigs might have caused cows to give a positive reaction to the agglutination test for *Brucella abortus*. An investigation of *Br.a.* infection in swine was therefore undertaken. The types of abortion—infectious and non-infectious—are described, the former being divided into non-specific and specific, the specific causes being *Br.a.* (porcine type), whereas the non-specific are various kinds of cocci. Diagnosis is by the aggl. test, titres of 1:100 to 1:200 being regarded as definitely positive, while agglutinations at a titre of 1:50 are regarded as suspicious.

The technique of collecting blood-samples from pigs is described in detail. It is advised that litters from reacting sows be reared in isolation for 120 days, as such litters are infected when born, but infection disappears after that period. Emphasis is laid on the danger to human beings from contact with the porcine type of infection.—H. BURROW.

DAYUS, C. V. (1988). **Vaccination of Ewes against "Pulpy Kidney". Trials in Otago and Southland, Season 1987.**—*N.Z. J. Agric.* **56**. 25-27. 2 figs., 2 tables. [See also *V. B.* **7**. 269].

The author discusses the results of the season's vaccination of pregnant ewes with formalinized whole culture of *Clostridium welchii* Type D. Of 11,600 lambs born of vaccinated ewes, losses due to "pulpy kidney" [enterotoxaemia] were 1.025 %; of 15,768 born of unvaccinated controls, 2.086 % died of "pulpy kidney". Ewes were vaccinated twice, first approximately six weeks before, and secondly as soon as possible after lambing.—L. W. N. FITCH.

ROSE, A. L., & EDGAR, G. (1986). **Enterotoxaemic Jaundice of Sheep and Cattle. A Preliminary Report on the Aetiology of the Disease.**—*Aust. vet. J.* **12**. 212-220. 2 figs. [16 refs.]

The authors discuss the similarity of "toxaemic jaundice of sheep", "haemolytic jaundice of sheep" and "yellows" and a condition affecting calves known as "ictero-haemoglobinuria of calves". A detailed description of each disease is given. As the outstanding characteristics of each are an intense icterus associated with haemoglobinaemia and haemoglobinuria, and since a haemolytic toxic bowel filtrate was obtained from cases in both sheep and cattle, the authors suggest that the diseases are identical and should be called "enterotoxaemic jaundice of sheep and cattle". In the cases investigated, it appeared that *Clostridium welchii* type A was the causal organism. In studying toxin-antiserum and culture-antiserum relationships, they noted that whereas *Cl.w.* type D antiserum would protect against type A toxin it would not afford protection against one M.L.D. of whole culture of type A inoculated intramuscularly, thus confirming reports by other workers.—T. S. GREGORY.

I. VAN SACEGHEM, R. (1988). **Production du vaccin contre le charbon symptomatique au laboratoire vétérinaire de Kisenyi. [Production of Blackleg Vaccine in the Veterinary Laboratory at Kisenyi (Belgian Congo)].**—*Bull. Soc. Path. exot.* **31**. 472-474.

II. MARTIN, L. A. (1988). **Culture de *Clostridium chauvoei* et préparation d'un vaccin contre le charbon symptomatique. [Cultivation of *Cl.c.* and Preparation of Blackleg Vaccine].**—*C. R. Soc. Biol. Paris.* **127**. 1059-1061. [1 ref.]

I. Vaccine was prepared from a virulent strain of *Cl.c.* in liver broth medium layered with vaseline, details concerning preparation being given. After good growth had occurred, 0.5 % formalin was added. When sterile this was issued as vaccine. The dose was 10 c.c., and immunity was shown to last at least six months.

II. M. used a medium similar to that mentioned above, but added 0.1 % of glucose. He inoculated 5-litre flasks with a portion of muscle from a g. pig newly dead from *Cl.c.* infection. After 1-4 days' incubation the culture was killed by the addition of 0.6 % formalin and issued as vaccine.—P. S. WATTS.

#### DISEASES CAUSED BY PROTOZOAN PARASITES

HORNBY, H. E. (1987). **Pathology and Therapeutics of Nagana : An Appeal.**—*J. comp. Path.* **50**. 312-313.

Attention is drawn to the neglected field of pathology of animal trypanosomiasis. The following are not yet known for certain :—(a) the distribution of any species of trypanosome within its host at any stage of infection ; (b) the manner

in which any species of trypanosome affects its host ; (c) the nature of immunity responses to infection ; (d) the extent to which the action of any drug is direct or indirect ; (e) where the destruction of trypanosomes as the result of drug action takes place ; (f) whether sterilization is ever the result of drug action without necessity for clearing up of stragglers by antibodies, and (g) why similar treatment should give different results with similar individuals infected with the same strain of trypanosomes.—J. A. GRIFFITHS.

STEEVENSON, G. F. (1988). **The Application of the Mercuric Chloride Test in an Outbreak of Surra in Waziristan.**—*J. R. Army vet. Cps.* 9. 88-85.

S. states that, from experience gained in this outbreak, the mercuric chloride test appeared to be unreliable for the detection of very recent infection in camels. In some cases reactions were not positive until two weeks after infection. After treatment with naganol the reaction persisted for about a month. Valuable notes on the procedure to be adopted when dealing with an outbreak, and on prophylaxis, are incorporated in the article.—D. D. OGILVIE.

FRENCH, M. H. (1938). **Studies in Animal Trypanosomiasis. I.—Nitrogen and Mineral Metabolic Disturbances Induced by *Trypanosoma congolense* and *Trypanosoma brucei*. II.—Disturbances Produced in the Plasma Proteins by *Trypanosoma congolense* and *Trypanosoma brucei*. III.—The Effects of *Trypanosoma congolense* and *Trypanosoma brucei* on Blood Urea.**—*J. comp. Path.* 51. 28-45. 10 tables. [Numerous refs.]

During the course of experiments to ascertain the effect of diet on *Tryp. congolense* infection in cattle and sheep and *Tryp. brucei* infection in sheep, the opportunity was taken to study the metabolic disturbances caused by these parasites in the hosts under experiment. Both infections caused an increased excretion of nitrogen, body bases, chlorides and phosphates, the increased excretion of body bases being explained as an attempt to get rid of acidosis. A sufficiency of minerals in the diet was required to prevent geophagia. The increased nitrogen excretion was ascribed to increased endogenous protein catabolism consequent upon wasting and fever, the increased nitrogen being excreted in the urine.

No increase of blood urea was found to occur in either infection, except at the end of the disease, immediately prior to death, when it was ascribed to the result of general autolysis of body tissue. Variations occurred in the total blood plasma protein content, but such variations were not constant. The non-protein nitrogen of the blood only showed an increase at crisis or near death, or after injection of antimosan.

The albumin : globulin ratio of plasma proteins was diminished by both infections, the albumin fraction reaching a minimum at death or crisis, but returning to normal in 5-8 weeks after recovery. The globulin increase was due to a great increase in the proportion of euglobulin, the maximum being reached at the time of crisis or death. After recovery, the euglobulin content returned to normal in 10-12 weeks.

The increase of euglobulin was greater in severe cases of disease than in mild cases, and was greater in the *Tryp. brucei* infections of sheep than in the *Tryp. congolense* infections. In one case of *Tryp. congolense* infection in an ox, in which the trypanosomes persisted for a considerable period after crisis, the return of the euglobulin to normal was considerably delayed.—U. F. RICHARDSON.

HOARE, C. A., & BROOM, J. C. (1938). **Morphological and Taxonomic Studies on Mammalian Trypanosomes. IV. Biometrical Study of the Relationship between *Trypanosoma uniforme* and *T. vivax*.**—*Trans. R. Soc. trop. Med. Hyg.* **31**. 517-534. 5 figs., 6 tables. [Numerous refs.] [See also *V. B.* **8**. 19].

The authors undertook a statistical investigation on the significance of the variation in length between specimens of *Tryp. vivax* and *Tryp. uniforme*. Nine blood films of the former and five of the latter were used as material, and 100 individuals were measured in each preparation. It is concluded that strains corresponding to the two species fall into two distinct groups, which are characterized constantly by differences in the mean lengths and in the range of length of the trypanosomes, and that the measurement of ten individuals from any strain provides a satisfactory method of identification of the species. The systematic position of the two groups is discussed and it is concluded that their original status as separate species should be retained. [The number of films examined does not seem to justify this conclusion].—U. F. RICHARDSON.

VON BRAND, T. (1938). **The Metabolism of Pathogenic Trypanosomes and the Carbohydrate Metabolism of their Hosts.**—*Quart. Rev. Biol.* **13**. 41-50. 1 fig. [Numerous refs.]

The author reviews the literature on the metabolism of trypanosomes and the theories as to their lethal mechanism. He concludes that there is no doubt that the carbohydrate consumption of trypanosomes is striking, in that they consume twice their own weight of sugar in 24 hours, and it appears that, as a rule, the pathogenic species consume more sugar than non-pathogenic species. *Tryp. cruzi*, however, appears to consume less than the non-pathogenic *Tryp. lewisi*. The sugar is only partially oxidized, the end-product being pyruvic acid. The fat and protein metabolism seem to be unimportant.

Infection appears to disturb the carbohydrate regulation of the host, the glycogen reserves are usually depleted, and there may be distinct hypoglycaemia a few hours before death. This hypoglycaemia is not, however, specific for trypanosome infections.

Three theories are presented to explain the disturbance of the carbohydrate metabolism of the host and its eventual death. One postulates that the consumption of carbohydrate is so great that a strain is thrown on the liver, leading to its failure to function and to a glycoprivic intoxication. This is criticized in that administration of sugar does not influence the course of the disease, and that the parasitic sugar consumption is not high enough to allow the assumption of effective interference with the host metabolism. Asphyxiation, due to blocking of the lung capillaries either by the agglutination of parasites or by lactic acid production, has been suggested as the cause of death, but has not found many adherents, and it has been shown that the lactic acid concentration is not great enough to inconvenience the host. A third theory suggests the production of other toxic end-products of trypanosome metabolism, and as proteolytic ferments have been detected in trypanosomes, it is suggested that a toxic amine may be produced.—U. F. RICHARDSON.

CULBERTSON, J. T. (1938). **Natural Transmission of Immunity against *Trypanosoma lewisi* from Mother Rats to their Offspring.**—*J. Parasit.* **24**. 65-82. 5 tables. [14 refs.]

Young rats born to dams recently recovered from *Tryp. lewisi* infection were immune for the first few weeks of life. That such immunity was acquired *in utero*

was shown by the fact that such animals still proved immune when raised by susceptible foster-mothers. That the immunity could also be transferred in the milk was shown in the resistance displayed by the young of susceptible dams when raised by immune foster-mothers.—U. F. RICHARDSON.

CULBERTSON, J. T., & KOLODNY, M. H. (1938). **Acquired Immunity in Rats against *Trypanosoma cruzi*.**—*J. Parasit.* **24**. 83-90. 3 tables. [3 refs.]

In rats infected with *Tryp. cruzi*, blood infection was continuous for three weeks, and then became intermittent for two weeks, after which peripheral blood infection ceased. After recovery, the rats under experiment became immune to reinfection, though no trypanosome infection could be detected. Susceptible rats inoculated with serum from immune animals showed an increased resistance in that the incubation period was lengthened. Therapeutically, serum from immune animals caused a sharp decrease in the number of blood trypanosomes, but no permanent disappearance could be produced even with repeated injections.—U. F. RICHARDSON.

JOHNSON, C. M. (1938). **Cardiac Changes in Dogs Experimentally Infected with *Trypanosoma cruzi*.**—*Amer. J. trop. Med.* **18**. 197-206. 1 table. [12 refs.]

The cardiac changes noted in experimentally infected dogs appeared to be the same as those of the acute fatal infection in Chagas' disease in human beings. A chronic stage of this disease has been demonstrated in dogs; the lesions differed only in intensity and in destructive character. In the experimental Chagas' disease in dogs the lesions occur more frequently in the outer and innermost layers of the myocardium: the central parts are less involved.

One of three strains used to infect dogs had been passaged a long time in g. pigs and it was less virulent than the other two strains obtained directly from human cases.—J. A. G.

KERR, W. R., & LAMONT, H. G. (1938). **Trichomonas Disease of Cattle. Observations in Northern Ireland.**—*Vet. Rec.* **50**. 730-731. [1 ref.]

The authors draw attention to wide-spread bovine sterility in Northern Ireland, this being due partly to trichomoniasis.

They give a clinical description of the disease complementary to that of STABLEFORTH, SCORGIE, and GOULD [*V. B.* **7**. 463]. The abortions commonly occur at a time corresponding to an oestral period; there is a characteristic type of vaginal discharge and the membranes of the embryos have a white, macerated appearance. Local farmers say that repeated services "feed the disease and keep the discharge going"; recovery is known to take place if several services are missed. Most cases occurred between September and January.

A medium for the cultivation of the parasites is described. Treatment was carried out by irrigation of the os uteri and vagina, and by filling the uterus with a 1:200 to 1:400 watery solution of iodine.—C. V. WATKINS.

SWARTZWELDER, J. C. (1937). **Studies on the Infection of Dogs with Trophozoites of *Endamoeba histolytica* by the Oral Route. A Preliminary Report.**—*Publ. Hlth Rep., Wash.* **52**. 1447-1451. [12 refs.]

Five out of 13 dogs were infected by the ingestion of trophozoites of *E.h.* from the cyst-free faeces of dogs experimentally infected with a human strain. In 14 out of 22 dogs, trophozoites traversed the stomach and small intestine in a viable state; they also withstood *in vivo* concentrations of HCl up to amounts requiring 40 c.c. of N/10 NaOH to neutralize 100 c.c. of gastric juice. Combined HCl was without effect in high concentration.—R. O. MUIR.

SPRINGHOLZ-SCHMIDT, A. J. (1987). Zur Frage der Pferdenuttalliose. [**Equine Piroplasmosis**].—*Z. InfektKr. Haustiere*. 52. 221-231. 1 table.

The author describes the disease of horses in Eastern Siberia first recognized as *Babesia equi* infection in 1993, and believed to have been introduced recently into the area. Until discovered in Siberia it was thought to be confined to South and central Russia. The disease in Siberia occurred in an acute form associated with a large type of parasite, and in a chronic form associated with a smaller type.

The author's investigations indicated that the disease was enzootic in the area, and that cases occurring in local animals must be ascribed to relapses. The chronic or latent form of the disease appeared most common, and was distinguished clinically by lassitude, weakness and anaemia, with slight fever. The large type of parasite occurred in the form of rings, ovals, pear-shaped individuals, and four individuals in the Maltese cross formation. The small type of parasite appeared in the same forms, but in addition, comma-shaped or rod-shaped organisms were encountered, and also anaplasma forms. The author discusses the evidence as to existence of two small species of *Babesia* in the horse, and the validity of the species *B. minor* of SASSUCHIN [*V. B.* 4. 462.], but concludes that as the organisms appeared as a series which merge into each other they should all be included in the species *B. equi*.—U. F. RICHARDSON.

IVANOVA-JOBZEM, P. S. (1987). Anaplazmoz ovce v Kara-Kalnaki. [**Anaplasmosis of Sheep in Kara-Kalpakia**].—*Sovyet. Vet.* Nos. 11-12. pp. 41-42.

An outbreak of *Anaplasma ovis* infection occurred in July-August in sheep in Kara-Kalpakia. The ticks which were abundant during June included *Hyalomma dromedarii*, *H. detritum*, *Rhipicephalus bursa* and *R. sanguineus*.

The blood corpuscle invasion is described; two thirds of the parasites were marginal and one third central in situation, and up to 2% of the R.B.C. were invaded.

The mortality in the sheep is not stated.

DAVIS, C. L., STILES, G. W., & MCGREGOR, A. N. (1988). **Coccidioid Granuloma in Calves**.—*J. Amer. vet. med. Ass.* 92. 562-563. [1 ref.]

Coccidioid granuloma, particularly in the form of lung lesions, has hitherto been regarded as an affection of the adult bovine, but in this paper the authors record finding lesions in the thoracic lymph nodes of 23 out of 48 Hereford calves, 8-10 months old. Seven of these calves also showed slight granulomatous lesions in the lungs. The calves were from Madera County, California, and were slaughtered in Los Angeles.—GWILYM O. DAVIES.

LAFENÊTRE, H. (1988). Existence de "Rickettsia conjunctivae" du mouton dans le midi de la France. [**R. conjunctivae in Sheep in France**].—*Rev. Méd. vét., Toulouse*. 90. 923-924. [1 ref.]

L. records the detection of *R.c.* in three flocks of sheep near Montpellier. The disease occurred as an acute conjunctivitis which might affect half the flock at one time. Conjunctivitis might persist for two days to a month and was sometimes accompanied by keratitis. On recovery the conjunctiva remained congested and characteristic granulations occurred under the eyelids. This condition is explained by the persistence of the rickettsia in the mucous membrane.—U. F. R.

I. KAMBERIS, E. (1987). La spirochétose des poules. [**Spirochaetosis in Fowls**].—*Thesis, Alfort*. pp. 68. [Numerous refs.]

II. PIGOURY, L. (1938). Infection expérimentale du pigeon par une souche virulente de *Spirochaeta gallinarum*. [**Experimental Sp.g. Infection in the Pigeon**].—*Bull. Soc. Path. exot.* **31**. 863-866. 1 table. [4 refs.]

I. A useful account of avian spirochaetosis, with special reference to its occurrence in Greece. The spirochaetes are considered to be protozoa, and it is claimed that during their development an ultravisible virus stage occurs. In Greece the disease is invariably acute, and is transmitted by *Argas reflexus*. Only one species of spirochaete is known to exist there. Although the parasites invade the ovary of the hen, the disease is not hereditary. Neither splenectomy nor thyroidectomy reduces the resistance of poultry to the infection.

II. P. records that he succeeded in setting up a fatal infection in a young pigeon with *Sp.g.* derived from a particularly virulent outbreak in poultry. Pigeons are considered to be resistant to natural avian spirochaetosis and, in most cases, to experimental infection.—GWILYM O. DAVIES.

IVANIC, M. (1937). Zur Kenntnis der gewöhnlichen Zweiteilung und der in den Leberzellen der Hausgans (*Anser domesticus* L.) vorkommenden multiplen Teilung (Schizogonie) bei *Leucocytozoon anseris* Knuth u. Magdeburg. [**Normal Binary Fission of L.a., and Multiple Fission (Schizogony) Observed in the Liver Cells of the Goose**].—*Arch. Protistenk.* **89**. 16-44. 48 figs. on 2 plates. [Numerous refs.]

A case of *L.a.* infection in a young goose was examined histologically. In sections of liver fixed in Bouin's fluid there could be observed parasites in two stages of multiplication—ordinary binary fission with single nuclei and multiple fission with multi-nucleated plasmodia forms, one individual giving rise to many new cells each complete with its own nucleus; type of multiplication was characterized by (1) a large increase in the number of nuclei, and (2) limited increase in the number of nuclei; both types could be observed side by side. In the blood the parasites had the form of haemosporidia.—SASSENHOFF (MUNICH).

I. YAKIMOFF, W. L. (1936). Zur Frage der Sarkozysten der Renntiere. [**Sarcocystosis in Reindeer**].—*Z. InfektKr. Haustiere.* **50**. 217-223. 4 figs., 2 tables. [5 refs.]

II. GOUSSEFF, W. F. (1936). Beitrag zur Sarkozystosefrage. Verbreitung von *Sarcocystis hirsuta*. Art der Uebertragung und Toxität der Sarkozysten. [**Sarcocystosis. Incidence of S.h. Method of Transmission and Toxicity of Sarcocysts**].—*Ibid.* 214-216. 1 table.

I. According to the reports of other workers in Scandinavia, Alaska and Siberia adult reindeer are very frequently infected with sarcocysts. Y. examined and found sarcocysts in pieces of muscle from reindeer of Western Siberia.

II. Sarcocysts are common in cattle in certain countries, and in some countries all the cattle may be infected. Investigations in Switzerland showed that 6% of calves between six and eight months old and of cattle over 2½ years old were infected with sarcocysts, the tissues most commonly infected being the oesophagus, heart muscle, tongue and diaphragm. The mode of transmission is not known, but it is thought that infection occurs either *per os* or through "biting" flies. Sarcocysts have doubtful pathogenic action, but in association with other infections may perhaps cause illness, particularly in calves. G. considers that *Sarcocystis tenella* may occasionally be the cause of loss in sheep. G. observed three cases of sarcocystosis in cattle which had died of icterohaemoglobinuria in the Azov-Black Sea area.—F. FREUDENBERG (HAMBURG).

## DISEASES CAUSED BY VIRUSES

I. ANON. (1938). **Foot-and-Mouth Disease in Great Britain.**—*J. Minist. Agric.* **44**. 943-958. 4 tables. [Reprinted in *Vet. Rec.* **50**. 254]. [See also *V. B.* **8**. 357].

II. ANON. (1938). **Foot-and-Mouth Disease.**—*Vet. Rec.* **50**. 267-268. [1 ref.]

I. This memorandum (dated 15.12.37) should be read in the original. The character of the disease and its history in Great Britain are discussed, as well as the methods adopted to deal with it, in particular the slaughter policy; the exceptional virulence of the 1937 outbreak is emphasized. General methods adopted to prevent the introduction of the disease are detailed. "Although it is not known whether birds can become infected, there is little doubt they can carry the virus mechanically." "There is strong circumstantial evidence pointing to the conclusion that the infection in Great Britain in October and November, 1937, was due to migratory birds acting as mechanical carriers." Preventive measures against this source of infection are not considered practicable.

The work of the Foot and Mouth Disease Research Committee continues; it includes the problem of immunization. Results obtained with serum from Germany are commented on. "Serum at present available cannot be relied upon to protect bovines from infection when intimately exposed to a highly infective case of the disease".

II. The importance of continuing the slaughter policy in Great Britain is emphasized. Figures show that during the peak period of the 1937-1938 outbreak, France had 12,873 outbreaks, Belgium 18,517, the Netherlands 81,066, and Germany 86,902, whereas of countries where the slaughter policy is enforced Switzerland had 273 outbreaks, Denmark 11 and Great Britain 236. The slaughter policy is an economic one, and although treatment is possible the difficulties of preventing the spread of an outbreak appear insuperable. Swift action is essential to stamp out infection. The high mortality in the outbreak here dealt with among young animals changed the adverse criticism of farmers to one of general support for an efficient slaughter policy, which is fully endorsed by the veterinary profession in the present state of our knowledge.—J. A. GRIFFITHS.

I. ECCLES, A., LONGLEY, E. O., & THOMSON, J. K. (1937). **The Demonstration of a Change in the Antigenic Structure of a Bovine Strain of Foot and Mouth Disease Virus during Serial Transmission in the Guinea-Pig.**—*J. comp. Path.* **50**. 412-420. 12 tables.

II. HULSE, E. C., & EDWARDS, J. T. (1937). **Foot and Mouth Disease in Hibernating Hedgehogs.**—*Ibid.* 421-430. 1 chart. [11 refs.]

I. In a previous report [*V. B.* **8**. 144.] mention was made of apparent mutations in strains of F. & M. disease virus after passage through g. pigs. One strain (147) when passed serially through g. pigs was apparently a pure "O" type at the 12th passage, but at the 15th it had entirely lost its "O" component and was definitely of the "C" type.

In this article it is reported that the original bovine material, after two years' storage in buffered glycerin, was again tested both in cattle and in g. pigs. It showed a relation to "O" and to "A", but had no affinity to "C". It was then transferred serially through g. pigs. At the ninth and tenth passages it behaved as a pure "O" with no indication of "A" or "C" components, but between the tenth and 13th transference there was again a sudden change in type. Animals immune to "O" and "A" respectively reacted with generalized lesions, whereas g. pigs protected against "C" were completely or almost completely resistant.

All three components were apparently detectable at the 12th passage. The significance of these findings is discussed.

II. Under normal conditions hedgehogs are highly susceptible to F. & M. disease virus, but they react poorly when they are hibernating. Experiments were undertaken to determine whether the virus would persist in animals infected in the active state and immediately induced to hibernate. The virus was introduced by the intranasal route and was localized to the respiratory tract by a dose of anti-serum. Hibernation was induced by transferring the animals to a dark, cool room.

Virus was still present in high concentration in the lungs and was also found in other tissues after two months. In one animal which was kept for four months no virus was detected, but the feet showed healed lesions. One hedgehog was revived after 82 days; it showed well marked lesions of F. & M. disease three days later, and infected in-contact healthy hedgehogs.

Non-hibernating animals placed under cool conditions often reacted mildly to small doses of virus, but after recovery they were incapable of spreading the disease to in-contacts.

The importance of the hibernating hedgehog as a possible carrier of the virus is discussed.—R. E. GLOVER.

WALDMANN, O., & KÖBE, K. (1988). Die aktive Immunisierung des Rindes gegen Maul- und Klauenseuche. ("Vorläufige Mitteilung). [**The Active Immunization of Cattle against Foot and Mouth Disease (Preliminary Communication)**].—Distributed at International Veterinary Congress. Reprinted in *Berl. tierärztl. Wschr.* June 3rd. 317-320. 2 charts. [14 refs.]

The authors report success in the preparation of a vaccine which fulfils the following requirements:—(1) inability to cause F. & M. disease in cattle, (2) the production of a slight local and general reaction, (3) the production of an adequate immunity. Details of preparation of the vaccine are not given, but are promised later. In this paper it is merely stated that the vaccine is composed of virus adsorbed on to aluminium hydroxide, which is then submitted to a process to make the virus avirulent, but not to affect its value as an antigen. In an experiment on about 90 cattle, the vaccine protected against artificial infection 14 days after its application.

The vaccine has been used on 40,000 cattle in the field in an area north of Breslau. The results will be reported later.—J. E.

WALDMANN. (1988). Riemser Maul- und Klauenseuche- (M.K.S.) Vakzine. [**The Riems Vaccine against Foot and Mouth Disease**].—*Dtsch. tierärztl. Wschr.* 46. 569.

The technique of preparation of the vaccine is given as follows:—cattle are infected intradermally in the tongue with highly virulent material and after 24 hours the vesicle covering and contents are carefully collected under narcosis. The average yield of material from each animal is 30 g. The material is then ground up in an electric Lapatie apparatus for one hour, diluted to a strength of 7% in distilled water, centrifuged and filtered. Then a mixture is prepared of 50 litres of Wildstätter and Schmidt's aluminium hydroxide, 10 litres of the filtered virus suspension, 40 litres of glyocoll buffer of a concentration to ensure a final pH of 9.0, and lastly 50 c.c. of Schering's formalin. This mixture is stirred for one hour in a special large airtight electric mixer and finally decanted into one-litre bottles.

The bottles are placed in an incubator (25°C.) for 48 hours, then transferred to cold storage (8-5°C.) where they remain pending tests and dispatch. The dose for cattle is 15-60 c.c., according to weight. The vaccine is tested on experimental

cattle kept in careful isolation which, after inoculation, are shut up for seven days not even the attendant having contact; the animals are then observed for the nature of the reaction set up, again shut up for seven days, and then tested for immunity by rubbing the tongue with a cloth soaked in virus. If they do not react within seven days the batch of vaccine is issued for field use.

The vaccine has been used on 150,000 cattle with great success. Immunity is evident from the fourth or fifth day and lasts for 4-5 months as far as is at present known. It is claimed that vaccinated cattle possess an almost complete resistance to natural infection in outbreaks of F. & M. disease.—J. E.

LIGNIÈRES, R. (1936). La vaccination antiaphteuse. [**Vaccination against Foot and Mouth Disease**].—*C. R. Acad. Agric. Fr.* 22. 1042-1053. 8 tables.

L. applied his brother's vaccination technique [*V. B.* 4. 518.] to a number of cattle in the field; of 124 animals vaccinated one cow contracted F. & M. disease two months after vaccination, five bulls after four months, and two other animals after nine months. The remaining cattle did not contract the disease although exposed to heavy infection. The vaccine itself did not produce any symptoms or lesions.—E. C. HULSE.

IVANOV, B. J. (1937). Novoe v izučenii patologo—anatomičeskikh izmenenii pri encefalomyelite lošadei. [**Study of Pathologic-Anatomical Changes in Encephalomyelitis in Horses**].—*Sovyet. Vet.* Nos. 11-12. pp. 64-68.

The disease as seen in Russia is essentially a diffuse encephalomyelitis, like the American form, and in addition a parenchymatous hepatitis and signs of inflammation of the reticulo-endothelial system occur. The hepatitis is associated with bilirubinaemia and icterus, which Russian workers emphasize as a common symptom of the disease in Russia [but it is not characteristic of the American form]. Inclusion bodies have been observed in the brains of affected horses in Russia.

PRITCHETT, H. D. (1938). **Rabies in Two Gray Squirrels**.—*J. Amer. vet. med. Ass.* 92. 563-564. [1 ref.]

This is a brief note on rabies in two grey squirrels (one wild) from Charlotte, North Carolina. The symptoms differed in the two animals; the tame squirrel attacked its owner, the wild squirrel was found partially paralysed on the ground. The disease was diagnosed by examination of the brains.

- I. LÉPINE, P., & SAUTTER, V. (1937). Lésions du système nerveux dans la maladie d'Aujeszky. [**Lesions in the Nervous System in Aujeszky's Disease**].—*C. R. Soc. Biol. Paris.* 123. 753-756. 3 figs. [3 refs.]
  - II. NICOLAU, S., CRUVEILHIER, L., & KOPCIOWSKA, L. (1937). Lésions cytologiques et présence d'inframicrobes et d'inclusions dans les tissus d'animaux infectés expérimentalement avec le virus de la maladie d'Aujeszky. [**Cell Lesions and Presence of Viruses and Inclusion Bodies in the Tissues of Animals Experimentally Infected with Aujeszky's Disease**].—*Ibid.* 756-759. [10 refs.]
  - III. REMLINGER, P., & BAILLY, J. (1938). Sur la présence du virus d'Aujeszky dans la glande de Harder. [**Presence of the Virus of Aujeszky's Disease in Harder's Gland**].—*Ibid.* 127. 657-658.
  - IV. TUNCMAN, Z. M. (1938). La maladie d'Aujeszky observée chez l'homme. [**Aujeszky's Disease in Man**].—*Ann. Inst. Pasteur.* 60. 95-98. 1 fig. [1 ref.]
- I. The authors describe the chief lesions of laboratory animals, principally

rabbits and mice, after infection by the virus of Aujeszky's disease. The C.N.S. is always more or less affected, generally corresponding in degree to the duration of the illness. The pia mater, more especially of the spinal cord, is infiltrated with polymorphonuclear and mononuclear leucocytes. The cephalic ganglia in addition to those of the spinal cord are at an early stage frequently the seat of an intense cellular infiltration and often of neuronophagia. The specific cellular reaction is minutely described and well illustrated, and the chief areas of the nervous system in which the reaction occurs are detailed. The cell changes include oxychromatic degeneration of the nuclei, and largely correspond to those seen in herpes. There is a great tendency to autolysis of the whole nervous system whatever the duration of the illness. These findings confirm those of HURST [*V. B.* 4. 349].

II. The authors detail the chief tissues of laboratory animals affected by Aujeszky's disease. The invasion and the multiplication of the virus particles in the affected cells is extremely rapid following intracerebral injection. At first a large number of minute cocco-bacillary or rod-shaped virus particles are scattered between the chromatin elements of the nuclei. These multiply at the gradual expense of the chromatin, so that the nuclei become filled with virus particles 100-150  $m\mu$  in size. The virus particles tend to agglutinate into eosinophilic staining masses up to 2-4 $\mu$  in diameter, with or without a halo, among the remainder of the virus particles.

In the fowl and pigeon the disease is slower in development, and a cell necrosis is more commonly seen than in the rabbit and g. pig.

Lesions in the plantar pads of g. pigs after intradermal inoculation of Aujeszky's disease virus show a cellular reaction very similar to that following inoculation of the virus of herpes.

III. The authors showed by transmission experiments that Harder's gland in cats and rabbits dead of Tunisian and Hungarian strains of Aujeszky's disease may contain the virus. They removed all traces of blood by repeated washings in distilled water and then prepared the material for inoculation; positive results were obtained in seven out of ten tests.

IV. The author describes two accidental infections of laboratory workers by this disease, both occurring as a result of hand injuries. In the first case an intense pruritis commenced at the finger and, travelling up the arm, affected the whole body for six hours. Only a general feebleness remained the next day. The second case did not develop pruritis until 18 hours after the injury, but this lasted for three days. An aphthous eruption of the lips and gums lasted a further four days. Hypercholesterinaemia and eosinophilia were present. The blood of this patient at the most intensely pruritic stage was infective for two rabbits.

Both cases recovered spontaneously with palliative treatment, and by that time the virus was no longer found in the blood.—C. V. WATKINS.

SCHLOTTHAUER, C. F. (1938). **Meningitis, Encephalitis and Myelitis in Dogs.**—*J. Amer. vet. med. Ass.* 92. 619-636. 6 figs. [5 refs.]

Viruses and bacteria and their toxins are stated to be the chief causes of meningitis, encephalitis and myelitis in dogs. Among the conditions which are associated with nervous complications in animals, S. refers to dog distemper, various food (fat, vitamin and mineral) deficiencies, uraemia, and infestation with intestinal parasites and with ticks. He observed chronic encephalitis in dogs, occurring as a primary disease, but he was unable to find any definite organisms in the brain and spinal cord of such cases. For details of the symptoms in the above conditions the original may be consulted. Meningitis usually causes hyper-

aesthesia about the head and neck, and if the spinal meninges are affected there is marked pain over the back. Disturbances of consciousness and motor functions are the most common symptoms of disseminated encephalitis. Local encephalitis, manifested by chorea, is generally referable to definite portions of the brain. The most frequent symptoms noted in myelitis is paralysis of both hind legs.

The pathological findings in the nervous system are described. It is pointed out that in old cases of encephalitis following distemper, definite lesions cannot always be demonstrated. S. gives the histories of ten cases altogether of meningitis, encephalitis and myelitis to illustrate the various symptoms and lesions observed in these diseases in dogs. The paper is really a clinical study.—N. J. SCORGIE.

I. BÉCLÈRE, A. (1937). Influenza. Revue générale. I. L'influenza épidémique et l'épizootie porcine ou "hog flu". [*Swine Influenza*].—*Pr. méd.* 45. 73-76. [10 refs.]

II. SHOPE, R. E. (1938). **Serological Evidence for the Occurrence of Infection with Human Influenza Virus in Swine.**—*J. exp. Med.* 67. 739-748. 2 tables. [18 refs.]

I. The relation of swine influenza to human influenza is reviewed in general terms, with special reference to the work of SHOPE. The particular points discussed are experimental transmission of swine influenza, the isolation and pathogenesis of *Haemophilus influenzae suis* and its association with a filtrable virus, and natural and acquired immunity. B. brings no fresh knowledge to the subject.

II. The susceptibility of swine to the virus of human influenza under experimental conditions has already been demonstrated by S. [*V. B.* 7. 226]. In this article he reports that three herds of pigs were apparently affected with the virus of the human infection under field conditions. The animals had been fed on garbage from institutes in which influenza-like outbreaks had occurred among the human inmates during the winter period; one of these epidemics had been studied in detail by other workers and a strain of human influenza virus had been isolated.

Neutralizing antibodies were found in the sera of several of the pigs many months after the human outbreak. The antibodies were detected by the inoculation of mice with mixtures of undiluted serum and infected mouse lung, and occurred only in the blood of the older pigs, born during the winter months. The sera failed to protect against swine influenza virus.

It is of interest that in one outbreak some of the sera blocked out the local strain of human influenza virus, but were not completely effective against the routine strain (P.R.8). It is suggested that this observation affords additional evidence of the existence of antigenically different strains of influenza virus.

—R. E. GLOVER.

I. BRIDRÉ, J., & BARDACH, M. (1938). Essais de sérothérapie préventive antivaccinale. [**Control of Vaccinia with Antiserum**].—*Ann. Inst. Pasteur.* 60. 270-276. 1 table. [5 refs.]

II. CESARI, E., & BOQUET, P. (1938). Préparation d'un sérum antivaccinal avec le testiculo-vaccin. [**Preparation of an Antivaccinial Serum by the Use of Testicular Virus**].—*Ibid.* 277-284. 2 figs., 1 table. [Numerous refs.]

I. Hyperimmune sera prepared by the repeated subcutaneous injection of rabbits and horses with a highly active neuro-vaccine were tested for their protective value on rabbits, g. pigs and mice by the method of passive immunity. The rabbit sera were easily assayed and were reasonably active. The horse sera, however, were difficult to test, as they showed a high toxicity for the rabbit, while the response of normal g. pigs to the test dose of virus was so erratic that the

results could not be analysed. Satisfactory protection was obtained in mice, but the numbers used were small.

The action of these sera was mainly in the direction of limiting the effect of the virus; they failed to prevent completely the appearance of lesions.

II. A hyperimmune serum was prepared by inoculating a horse (subcut.) with a strain of testicular vaccine. In order to obtain large amounts of infective material, rabbits were inoculated intraperitoneally with testicular emulsion, and the peritoneal fluid plus the omentum were used as inoculum.

The value of the sera was determined by mixing decreasing amounts with a fixed quantity of virulent pulp and applying the mixture to the skin of rabbits. After nine months the serum in a dose of 0.005 c.c. completely neutralized about 8 minimum infective doses of vaccine, while amounts as low as 0.00005 c.c. were partially effective.—R. E. GLOVER.

I. BLANC, G., & MARTIN, L. A. (1938). Réaction de l'âne au virus claveleux. [**The Reaction of Donkeys to Sheep Pox Virus**].—*C. R. Soc. Biol. Paris*. **127**. 1426-1427.

II. BLANC, G., & MARTIN, L. A. (1938). Action de la bile sur le virus anticlaveleux. [**The Action of Bile on Sheep Pox Virus**].—*Ibid.* **128**. 71-72. [1 ref.]

I. A local reaction, from which the virus was recovered, was induced in donkeys inoculated subcutaneously with sheep pox virus. Injected into the anterior chamber of the eye, the virus induced an iridocyclitis followed by a local immunity of short duration. The sera of donkeys receiving repeated doses of the virus once a fortnight for ten months showed neutralizing antibodies.

II. Bile exerted a modifying action on sheep pox virus. The mixture induced a local reaction comparable to that resulting from a properly balanced serum-virus suspension. The proportion of bile to virus recommended is 1 : 20 for a period of 48 hours, or 1 : 100 for five days.—R. E. GLOVER.

BLAIZOT, L. (1937). Ecthyma contagieux du mouton et de la chèvre. [**Contagious Ecthyma of Sheep and Goats**].—*Thesis, Alfort*. pp. 78. 11 figs., 1 table. [Numerous refs.]

B. gives a general review of contagious pustular dermatitis of the sheep and goat. Details of personal investigations are meagre, but the transmission of the virus to the rabbit and the donkey is reported. He advocates protective inoculation of animals in affected areas by the application of suspensions of dried virus to those parts of the skin where there is a minimum danger of secondary infection.  
—R. E. GLOVER.

MOSES, A. (1937). Ação da saponina, sobre o virus do myxoma infectuoso dos coelhos. [**Action of Saponin on the Virus of Infectious Myxoma of Rabbits**].—*Rev. Produc. anim., Rio de J.* **4**. 47-49. [6 refs.] [French summary].

The virus was still fully virulent for rabbits after being kept at room temperature for seven days in 2% saponin.

10% saponin acting for 10-30 days was usually lethal to the virus. Saponinized virus had no value as a vaccine.

After 32 days in a refrigerator the virus-saponin mixture [strength of saponin not given] was capable of causing localized lesions only, but full virulence was regained after three passages.—S. TORRES.

SCHLESINGER, M., & ANDREWES, C. H. (1937). **The Filtration and Centrifugation of the Viruses of Rabbit Fibroma and Rabbit Papilloma.**—*J. Hyg., Camb.* **37**. 521-526. 4 tables. [15 refs.]

Particle size of the virus was estimated by both the filtration and centrifugation methods in each case. Titration of the virulence of each virus was done, using rabbits, by intradermal inoculation or scarification. Preliminary clarification of the virus was made through asbestos pulp or paper pulp and sand. The former gave better clarification, but could not be used for fibroma virus, since it greatly reduced the virulence of the virus by adsorption. The particle size of the virus as estimated by indirect methods gave a particle size in the region of 125-175  $m\mu$ . From data obtained by suspending and spinning the virus in solutions of saccharose of known specific gravity, the size of virus was calculated to be 126-141  $m\mu$ , values which agree with those obtained by filtration. Results obtained by filtration of papilloma virus were more regular than those obtained by the filtration of fibroma virus. The particle size of the virus was calculated directly from these results, giving values of 23-35  $m\mu$ . Centrifugation of the virus gave higher values than filtration, i.e., 32-50  $m\mu$ .—L. E. HUGHES.

BESREDKA, A., & GROSS, L. (1938). Du rôle de la peau dans le sarcome de la poule au point de vue de la réceptivité et de l'immunité. [**The Role of the Skin in Fowl Sarcoma with Reference to Susceptibility and Immunity**].—*Ann. Inst. Pasteur.* **60**. 465-476. [11 refs.]

The authors found considerable differences in the development of the fowl sarcoma, according to whether the fowl was infected by subcutaneous or intradermal inoculation.

It was found that subcutaneous sarcomata took longer to develop than the intradermal type. The subcutaneous tumours which did develop became rapidly larger and caused death. Intradermal sarcomata developed slowly, frequently showing arrested growth for months; when small doses of inoculum were used, the resulting tumours might be reabsorbed in a few cases.

Fowls which reabsorbed intradermal tumours became refractory to further inoculations of sarcomatous material, administered either intradermally or intramuscularly. Such immunity was lasting, solid and specific.

As it was not possible to immunize birds passively with sera from hyperimmune birds, the authors concluded that the resistance was of a cellular nature.—D. L. H.

ASK-UPMARK, E. (1938). Ein gehäuftes ("epidemisches") Vorkommen von Hühnertumoren. [**An Outbreak of Fowl Tumours**].—*Frankfurt. Z. Path.* **52**. 51-53. 1 fig. [1 ref.]

In a poultry flock of 100 hens about 25 died in the course of one year from ovarian carcinoma, the tumours being pale yellow and of great size. Metastasis was seen on the peritoneum and in the liver. Attempts at transmission failed. No details are given of any histological work.—SASSENHOFF (MUNICH).

SABIN, A. B. (1938). **Progression of Nasally Instilled Viruses along Different Nervous Pathways in the Same Host.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 270-275. 1 fig., 1 table. [Numerous refs.]

S. studied the routes taken by the neurotropic viruses of vesicular stomatitis, eastern equine encephalomyelitis and Aujeszky's disease. It was found that 15-day-old mice were much less susceptible to the virus of Aujeszky's disease than to those of the two former conditions.

Transverse serial sections were made of the entire skull, without the lower

jaw, with all the cranial nerves and autonomic ganglia, and representative regions of the spinal cord.

With vesicular stomatitis and eastern equine encephalomyelitis the lesions which permitted mapping of viral progression were those of neuronal necrosis, whereas with Aujeszky's disease virus the lesions were indicated by acidophilic intranuclear inclusion bodies in the path of the virus, with no necrosis.

The vesicular stomatitis and eastern equine encephalomyelitis viruses, as reported previously, followed the pathway of the olfactory nerve [V. B. 8. 770]. Aujeszky's disease virus, on the other hand, followed the course of the fifth and seventh cranial nerves and the sympathetic. Evidence was obtained that these viruses did travel along the nerve routes and were not conveyed there by the blood, by demonstration of the fact that virus inoculated into the leg of a rabbit resulted in abundant virus in the blood with no lesions in the structures mentioned; again, nasal instillation resulted in unilateral invasion by the virus in all cases observed, and the virus was not found in any nerves or ganglia having no connexion with the instilled mucous membrane.

S. concludes that the facility with which certain neurotropic viruses invade the C.N.S. after nasal instillation is dependent upon a special affinity between certain viruses and certain cells.—L. E. HUGHES.

BURNET, F. M., KEOGH, E. V., & LUSH, Dora. (1937). **The Immunological Reactions of the Filterable Viruses.**—*Aust. J. exp. Biol. med. Sci.* 15. 231-368. 27 figs., 18 tables. [Numerous refs.] [Supplement obtainable in monograph form, University of Adelaide. (10s.)].

This excellent production is a review of the reactions between viruses (including plant viruses and bacteriophages) and their homologous antisera; it was primarily inspired by the results of the work of the authors on those viruses which produce discrete pocks on the chorio-allantoic membrane of the developing egg. The section on plant viruses is wholly a compilation from the literature. The experimental work and the discussion of results are full of interest, especially for those particularly concerned with the theory of immunity and antigen-antibody reactions. The developing egg technique is specially suited for the study of the virus-neutralization reaction, and accurate results can be obtained without the necessity of using a large number of experimental animals. The viruses used by the authors were those of vaccinia, influenza, louping ill, Rift Valley fever, equine encephalomyelitis, Newcastle disease, infectious laryngotracheitis of fowls, and myxomatosis of rabbits.—T. S. GREGORY.

GLASER, R. W. (1938). **Test of a Theory of the Origin of Bacteriophage.**—*Amer. J. Hyg.* 27. 311-315. 2 tables. [5 refs.]

G. designed experiments to test a theory that bacteriophage is produced as a result of an interaction of the host and a susceptible bacterium. For this purpose the common house-fly was reared under aseptic conditions; it was repeatedly shown through many generations that the experimental flies were free from both bacteria and 'phage. Flies caught in nature or bred in the contaminated state invariably contained 'phage.

The establishment in the alimentary tract of sterile house-flies of a non-lyso-genic staphylococcus known to be susceptible to lysis did not lead to the establishment of 'phage. In the absence of this micro-organism, 'phage, when given to sterile flies, survived for one generation, whereas in the presence of the bacterium it persisted for eight generations, when the experiment was concluded.

The theory is considered not proved nor disproved.—L. E. HUGHES.

## PARASITES IN RELATION TO DISEASE [GENERAL]

DE JESUS, Z. (1938). **External and Internal Metazoan Parasites of Philippine Cattle.**—*Philipp. J. anim. Indust.* 5. 21-34. 1 table. [Numerous refs.]

A study was made of the relative percentage infestation with external and internal parasites of carcasses of cattle used for the manufacture of rinderpest vaccine. The cattle ranged from three to five years in age and came from certain stated provinces. A table showing the percentage infestation is given, followed by a few notes on each parasite. *Boophilus australis* was found on 95% of the cattle: this tick, together with *Fasciola hepatica*, *F. gigantica*, *Oesophagostomum radiatum* and *Haemonchus contortus*, are found throughout the Philippines. Cases of heavy infestations with *H.c.* met with in both young and old cattle and water buffaloes showed that young cattle were severely affected and that water buffaloes tolerated the infestation. Mixed infections of *F.h.* and *F.g.* were encountered.—R. FISHER.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SACCHI, R. (1937). Gli ectoparassiti dei polli. [The Ectoparasites of Fowls]. —*Note Appunti sper. Ent. agrar.* 3. 43-78. 18 figs. [Numerous refs.] [Copied verbatim from *Rev. appl. Ent.* 26. 61].

Descriptions are given of the species of Mallophaga, mites and ticks that infest fowls, with general notes on their bionomics and control.

JACKSON, C. H. N. (1936). **Some New Methods in the Study of *Glossina morsitans*.** —*Proc. zool. Soc. Lond.* Part 4. pp. 811-896. 9 figs., 12 plates, 30 tables. [Numerous refs.]

Field studies of *Gl.m.* in typical tsetse country, at Kakoma, Tanganyika Territory, were undertaken to test the value of results obtained previously in other districts, and to meet certain criticisms of the validity of previous conclusions. J. shows that the hunger stage of flies can be assessed by visual examination of the gut in the field, and shows by this means that hungry flies search for game, and tend to concentrate in recognized feeding grounds.

The reliability of a method of estimating the total fly population [see *V. B.* 8. 226.] is discussed, and some studies on fly numbers by this method are recorded.

Field observations on the choice of breeding sites, the influence of vegetation on seasonal distribution and activity of flies, and the relation of population density to evaporation rate, are given in detail.—J. MACLEOD.

SIMMONS, S. W. (1937). **Some Histopathological Changes Caused by *Hypoderma* Larvae in the Esophagus of Cattle.**—*J. Parasit.* 23. 376-381. 6 figs. [6 refs.]

The following is the author's summary: Some of the principal histopathological reactions resulting from the invasion of the oesophageal tissue of cattle by *Hypoderma lineatum*, Vill., are described and illustrated. Typically the larvae occur in the submucosa and cause inflammatory oedema. The oedema produced about the larvae distorts the submucous connective tissue and occasionally invades the muscularis mucosa. The infiltration of leucocytes into the pathological area is striking. Most of the haemocytes are eosinophils, lymphocytes, and plasmocytes. In some cases, many of the eosinophils present were myelocytes. Eosinophils may be present at an average density of 476,365 cells per cubic millimetre of tissue. The healing of a larval channel is described and illustrated.

COTTRAL, G. E. (1938). **Buffalo Gnats in the Ears of Horses.**—*Vet. Med.* **33**, 376-377. [8 refs.]

A number of cases of infestation of the ears of horses with *Simulium vittatum* are recorded. Although the flies were present in considerable numbers, there were no dangerous sequelae. Local treatment with camphor-phenol afforded considerable protection from further attacks. A summary of the pathogenicity of the fly as expressed by various authors is appended. It is said that as there is some doubt, the pathogenetic aspect of the condition merits further research. [Deaths in cattle and horses due to attacks by midges are well known in Europe].

—D. D. OGILVIE.

OSWALD, B. (1938). Lésions externes observées chez des tiques conservées au laboratoire. [External Lesions in Ticks Kept in a Laboratory].—*Ann. Parasit. hum. comp.* **16**, 151-152. 6 figs. on 1 plate. [1 ref.]

O. describes a mycelial growth which affected some individual ticks of *Boophilus annulatus calcaratus* stored in Petri dishes under moist conditions in his laboratory at Skoplje, Yugoslavia. The engorged females which were attacked usually died, presumably from occlusion of the spiracles.

An affection of the cuticle of engorged female *Hyalomma aegyptium*, resembling in appearance eczema of mammals, and the occurrence of circular patches of desiccation on the cuticle of *B. annulatus calcaratus* and *Ixodes ricinus*, are briefly described.—J. MACLEOD.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

TAYLOR, E. L. (1938). **The Logical Approach of Veterinary Parasitology to Obscure Disease Problems.** [Correspondence].—*Vet. Rec.* **50**, 484-486. [4 refs.]

A general discussion of present research methods in parasitology, stressing the need for a more critical attitude to the apparent disease relationships of parasitic worms, particularly in poultry, and emphasizing the danger of assuming a causal relationship between observed heavy infestation and disease. T. suggests that the proper approach to the study of veterinary parasitology is from the individual disease to the cause, rather than from the parasites to possible resulting disease, as otherwise there is a danger of wasteful expenditure of resources on aspects which may turn out to be unimportant.

The report of the Poultry Technical Committee [V. B. **8**, 395.] is instanced to show how lack of precise information of the relationship of parasitism to disease has resulted in widely divergent diagnoses of the main causes of poultry mortality being given by different centres.—J. MACLEOD.

ARENAS MARTORELL, R., PEREIRA PÉREZ, R., & WAHLEMBER, A. (1937). Afecciones parasitarias del tejido muscular en nuestros animales de matadero. (Bovinos, ovinos, caprinos y porcinos). [Trichinella and Cysticercus in the Muscular Tissue in Cattle, Sheep, Goats and Pigs].—*Rev. Med. trop. parasit., Habana*. **3**, 43-45. [Copied verbatim from *Helminth. Abstr.* **6**, 61-62. Signed B. G. P.]

Arenas Martorell and his collaborators contribute brief notes on *Trichinella*, *Cysticercus bovis* and *C. cellulosae*. *Trichinella* probably occurs in Cuba, but is not systematically looked for. *C. bovis* is present in over 3% of Cuban cattle, while *C. cellulosae* is rare.

GRIEDER, H. (1937). Seltene Nutriaparasiten. [**Rare Parasites of Nutria**].—*Schweiz. Arch. Tierheilk.* **79**. 520-525. 4 figs. [4 refs.]

G. observed the following rare parasites in nutria:—*Fasciola hepatica* twice (in one case it was the cause of death); *Stichorchis waltheri* n.sp. once in the caecum of a nutria imported from Argentina; *Echinococcus granulosus* once and *Filaria kitti* n.sp. in a number of cases.—SASSENHOFF (MUNICH).

OLDHAM, J. N. (1938). **Internal Parasites of Pigs**.—*Vet. Rec.* **50**. 679-685. [12 refs.]

A short summary is given of the internal parasites of pigs, with brief indications of their economic importance. A catalogue of British species is included, and their life-histories and pathogenicity are traced. A number of foreign species are also mentioned.

The overwhelming importance of *Ascaris lumbricoides* relative to all other species in Great Britain is emphasized, and it is dealt with in some detail.

General indications of control and treatment are appended.—D. D. OGILVIE.

CLAPHAM, Phyllis A. (1938). **The Relation of Helminthiasis to Leukaemia in Domestic Fowls**.—*J. Helminth.* **16**. 53-56. [3 refs.]

On P.M. examination of 50 fowls, many of which were affected with leukaemia, a correlation was found between the degree and stage of parasitic infestation and the presence of leukaemia.

The series comprised normal birds slaughtered for food, birds which had died from causes other than leukaemia, and leucaemic birds. The two latter classes carried a heavier helminth infestation than did the normal birds. Among the parasites found were *Heterakis gallinae*, *Capillaria longicollis*, and *Ascaridia lineata*. Although the worm burden in the leucaemic birds was heavy, the majority of the worms were very young adults and immature forms.

C. suggests that there is considerable circumstantial evidence that the presence of leukaemia virus may predispose the host to helminth infestation. As leukaemia takes 6-8 weeks to run its course, and the young forms of *Heterakis* and *Ascaridia* found in this case were about three weeks old, it appears that the increased infestation may well have been associated with a lowered resistance to helminths following infection with leukaemia virus.—D. L. HUGHES.

ROBERTSON, D. (1937). **Lungworms in Pigs**.—*Scot. J. Agric.* **20**. 373-377. 6 plates, 1 table. [1 ref.]

R. examined 1,009 apparently healthy bacon pigs 6½ to 7 months old from seven counties in north-east Scotland, most of them coming from Aberdeenshire. He tabulates the incidence of lungworms found, the average infestation being 11 worms, and the maximum 65.

R. determined that infective larvae from injured earthworms may survive for two weeks and that these hosts may harbour up to four thousand larvae.—C. V. W.

CURLEY, E. M., & HERRING, F. G. (1938). **The Conquest of Strongyloidiasis**.—*Vet. Bull. U.S. Army.* **32**. 197-206. 3 charts.

The authors describe highly successful results which attended their treatment of strongyloidiasis in cavalry horses in the U.S.A.

The degree of infection was first ascertained by the sugar-flotation method. After fasting for 24-36 hours, the horses were given, by stomach tube, 10 c.c. of oil of chenopodium in liquid petrolatum and linseed oil. Purging occurred in

18-24 hours. Following the treatment, a bran mash was given, but hay was restricted in quantity, and no grain was allowed for four days.

Egg counts were retaken two to six weeks after treatment and according to this test the treatment was 90% efficient. In horses over 1,200 lb. weight, however, 16 c.c. doses of chenopodium were necessary to give comparable results.—D. D. O.

I. GRIEDER, H. (1937). Strongyloidesseuche in zwei Nutriafarmen. [**Strongyloides Outbreaks in Two Nutria Farms**].—*Schweiz. Arch. Tierheilk.* **79**. 475-480. 2 figs. [5 refs.]

II. ENIGK, K. (1938). Zur Biologie des Strongyloides aus dem Sumpfbiber. [**Biology of Strongyloides from the Nutria**].—*Dtsch. Pelztierz.* **13**. 2-5. 1 fig., 1 table. [8 refs.]

I. A heavy strongyloides infestation of nutria was found in two farms; in the young animals coccidiosis was also present. Attempts to expel or kill the worms with an extract of *Allium sativum* or by the feeding of garlic were unsuccessful. The animals gradually recovered from the ill-effects of the worm infestation, and G. suggests that this was partly due to the garlic, which he considers to have an anodyne action on the intestine.

II. *Strongyloides myopotami* is a specific parasite of nutria. It is a minute, hair-like roundworm 5-6 mm. long. The eggs are produced in the intestine of the host and are passed out to give rise to larvae which develop during about 2½ days in water or on wet ground; they quickly perish on dry ground. The infective larvae reach the host from the ground and bore their way through the skin, passing by way of the lymph channels to the right side of the heart and thence to the lungs. If they reach the bronchi they are coughed up and swallowed. This process takes 15-20 days from the time the larva infects the host. For control purposes it is necessary to clean out the cage and swimming pond every second day.

—SASSENHOFF (MUNICH).

I. RUBLI, H. (1936). Trichinose beim Sumpfbiber, *Myocastor coypus* Mol. [**Trichinosis of the Nutria**].—*Schweiz. Arch. Tierheilk.* **78**. 420-424. [7 refs.]

II. SCHOOP, G. (1937). Trichinenschau bei Pelztieren. [**Trichina Inspection in Fur Animals**].—*Dtsch. Pelztierz.* **12**. 270-272. 1 fig.

I. Trichinosis was found in five people who had consumed nutria flesh. A trichina inspection was carried out on other fur animals on the same farm, and trichina were found in the muscles of three nutria, one mink and two rats. In the nutria the muscles of the throat, neck and chest regions were most severely infected. In all cases the infections were fresh ones.

II. In recent years in Germany cases of human trichinosis following the eating of game and fur animals have been observed. In future all carnivorous fur animals, and other animals which may possibly be carriers of trichinosis and may ultimately be used for human consumption, must be examined for trichina.

—SASSENHOFF (MUNICH).

## IMMUNITY

BOQUET, P. (1937). Sur la sensibilité allergique des animaux pseudo-tuberculeux. [**Allergic Sensitivity of Animals Infected with *Pasteurella pseudotuberculosis***].—*C. R. Soc. Biol. Paris.* **125**. 411-412. [8 refs.]

B. describes experiments carried out to determine whether g. pigs infected

with *Past. pseudotuberculosis* would give an allergic reaction to an intradermal injection of the organism. He concludes from the results that the diagnostic value of the test is questionable, since a high proportion of controls free from pseudo-tuberculous lesions also gave a positive reaction.

KALINNIKOV, V. G. (1937). Diagnostika kroničeskih form sapa. [**Diagnosis of Chronic Forms of Glanders**].—*Sborn. Rab. Leningrad. vet. Inst. 1937*. pp. 117-126. 3 tables. [12 refs.] [German summary].

K. compared the ophthalmic [sic] and subcutaneous mallein tests on two lots of horses from infected districts and states that he found that the subcutaneous test was more reliable for this purpose. [No verification of the test results by P.M. examination was carried out].

DEAN, H. R. (1937). **The Reaction of Isamine Blue with Serum.**—*J. Path. Bact.* 45. 745-771. 6 tables. [6 refs.]

D. has found that in optimal proportions the dye isamine blue is precipitated from solution when mixed with serum. The constituent of the serum responsible for the precipitation of the dye may be globulin. When precipitation occurs in optimal proportions of dye and serum, the former falls to the bottom as a blue deposit, leaving a water-clear supernatant. The appearance of the floccules suggests that the dye particles are agglutinated by the serum.

This reaction may be of use in the quantitative estimation of the reacting substance, probably globulin, in certain body fluids.

The addition of this dye to a mixture of horse-serum and anti-horse-serum in optimal proportions results in precipitation of the dye. The dye can thus be used as an indicator of the specific reaction of antigen and antibody, in a similar manner to a haemolytic system.—D. L. HUGHES.

HETTCHE. (1937). Die Einwirkung enteraler und parenteraler Infektionen und Intoxikation auf den Dünndarm. [**The Action of Enteral and Parenteral Infection and Intoxication on the Small Intestine**].—*Zlb. Bakt. I. (Orig.)* 140. 74-76. 1 fig., 1 table.

A method is described of testing the effect of bacteria or their toxins on the isolated living intestine, by subcutaneous or enteral injection. Botulinus toxin has no effect, nor has diphtheria toxin when injected enterally, but when injected subcutaneously it inhibits the action of the intestines. Diphtheria and Breslau bacilli have a similar but less marked action.—P. S. WATTS.

NÉLIS, P. (1938). Sur les rapports existant entre les anticorps humoraux et les anticorps du liquide céphalo-rachidien. [**Connexion between Humoral Antibodies and the Antibodies of the Cerebrospinal Fluid**].—*Rev. Immunol.* 4. 53-64. 2 tables. [12 refs.]

Nine rabbits were injected intraspinally and seven subcutaneously with T.A.B. vaccine. The agglutinating titre of the serum and cerebrospinal fluid of each rabbit was tested after 30 days. While all the sera were strongly positive, the cerebrospinal fluids were negative. The serum and cerebrospinal fluid of nine survivors from 24 rabbits, injected intravenously with live paratyphoid bacilli, were tested after a month. The average titre of the sera was 1 : 20,000 and of the cerebrospinal fluid 1 : 40. A third experiment in which three rabbits were injected intraspinally with anastaphylotoxin confirmed N's opinion that the cerebrospinal antibodies were of humoral origin. Intraspinally injection of four rabbits with broth was found to increase the passage of humoral antibodies into the cerebrospinal fluid.—R. O. MUIR.

HEIDELBERGER, M. (1988). Les aspects chimiques de la fonction antigène et leurs rapports avec les agents infectieux. [**Chemical Aspects of Antigenic Action and their Connexion with Infective Agents**].—*Rev. Immunol.* 4. 293-308. 2 figs., 2 tables. [Numerous refs.]

This article consists of a general review of present-day knowledge of the chemistry of antigens. The fundamental researches on the alteration of the specificity of various antigens by nitration and halogenation, by methylation, esterification and acetylation of proteins, and the building up of synthetic antigens by means of the di-azo reaction are discussed. The antigenic structure of various groups of bacteria is surveyed from the chemical aspect. The following groups of micro-organisms are considered:—pneumococci, haemolytic streptococci, the varieties of the tubercle bacillus, the salmonella, the bacillus group, the brucella, and the vibrios.

The article should be read in the original by all who need a concise and adequate summary of the advances gained in this aspect of immunity.—D. L. H.

## DISEASES, GENERAL

DATTA, S. C. A. (1988). **Animal Diseases in Relation to the Economy of Man in India**.—*Agric. Live-Stk India*. 8. 123-140. 38 figs. on 3 plates, 1 table.

This is a popular article in which animal diseases are discussed from the aspect of national health and wealth with special reference to India. A useful table is given showing the diseases of animals communicable to man and their mode of transmission.—N. J. SCORGIE.

MULLEN, A. L. (1937). **Report upon a Two-Year Survey of Wastage Due to Disease in a Number of Lancashire Milk Recorded Herds**.—*Yearb. Lancs. Milk rec. Soc.* 1937. pp. 26-36. 5 tables.

A survey of 35 farms (records only received from 21) containing 1,400 cattle yielded some interesting figures. 40.7% of the total disposals were due to actual disease. Of these, sterility accounted for 11.5%, mastitis for 9.2%, contagious abortion for 8.0% and tuberculosis for 5.7%. Other diseases seldom exceeded 2% of the total. In addition, 25.3% were disposed of owing to abnormalities and defects and 33.9% for reasons quite apart from disease and defects. Mastitis was found on most of the farms visited, and the great majority of the cases were of the insidious streptococcal type. Losses from Johne's disease were low and almost exclusively associated with ground water supplies. Reference is made to the significance of tuberculosis and this is along orthodox lines. Losses from contagious abortion appear low, but these figures only represent actual wastage and not abortion infection or sterility losses resulting therefrom. Sterility was the greatest source of wastage, and with contagious abortion it is jointly responsible for most of the difficulty in self maintenance.

M. suggests there is room for a general all-round improvement in cattle farming and recommends the utilization of modern scientific methods for the attack on animal diseases. He deplores the faith placed in patent medicines and urges a greater appreciation of the veterinarian's services.—R. FISHER.

MOUTAUX. (1988). Notes cliniques de pathologie bovine. [**Clinical Notes on Bovine Pathology**].—*Rec. Méd. vét.* 114. 326-329.

Short notes are given on the following conditions:—the accumulation of pus in the region of the croup, buttock or thigh following foot and mouth disease;

vomiting in a cow during pregnancy; the occurrence of lateral flexion of the neck in bovines just before death; diffuse haematoma of the inferior cervical region in a calf, attributed to haemorrhage from the thymus; bovine lymphangitis; abscesses of the abdominal wall in cattle, due to foreign bodies; perforation of the rectum in a pregnant cow without any accompanying lesion in the uterus; colic in the early stages of bovine pyelonephritis.—GWILYM O. DAVIES.

ROWLANDS, W. T. (1938). **Some Local Sheep Disease Problems.**—*Vet. Rec.* 50. 604-610.

R. gives a short description suggesting also lines of treatment of each of the common diseases of sheep in North Wales, *viz.* enterotoxaemia, braxy, lamb dysentery, "struck" [anaerobic infection], infectious pneumonia, pregnancy toxæmia, liver fluke infestation and parasitic gastro-enteritis.—P. S. WATTS.

CURASSON, G. (1938). **Maladies du mouton dans les colonies. [Sheep Diseases in the French Colonies].**—*Rec. Méd. vét. exot.* 11. 5-22. [1 ref.]

C. notes that the diseases in the French colonies differ from those in France owing to climatic conditions, the multiplicity of breeds of sheep, and the presence of different exciting agents. Of virus diseases he notes the distribution of blue-tongue, Nairobi disease, Rift Valley fever, sheep pox and contagious pustular stomatitis. In the case of bacterial diseases, anthrax, blackleg and pasteurellosis are noted. Heartwater is discussed. Parasitic gastro-enteritis and mange are important. Trypanosomiasis and piroplasmosis are said not to cause great loss in sheep. Mineral and vitamin deficiency diseases are also common, while losses are caused by the direct heat of the sun and by plant poisoning. Of diseases on which more research is required, enterotoxaemia, in Annam, and pleuro-pneumonia, in Africa, are mentioned. Finally the relative importance of the various diseases in each colony is given.—P. S. WATTS.

KÖBE, K. (1938). **Gehäufte Erkrankungen bei Wildschweinen eines Sauparks. [Diseases of Wild Pigs in Parks].**—*Berl. tierärztl. Wschr.* April 8th. 199-201. 1 table. [7 refs.]

The detailed results of the examination of the organs of nine wild pigs are given under the headings of pathological anatomy, bacteriology and animal inoculation. Five were heavily infested with lungworms and two others died from swine influenza. The cause of death in the two remaining was not decided. In every case swine fever was excluded by the inoculation of normal pigs. K. discusses the question whether S.F. occurs among wild pigs [see *V. B.* 8. 703.], and concludes that it does not.—P. S. WATTS.

WATKINS, C. V. (1938). **Some Diseases of Silver Foxes.**—*Vet. Rec.* 50. 481-489.

This paper is concerned mainly with parasitic infestations of foxes. Among the ectoparasites of the ear, the mange mite (*Otodectes cynotis*) is important. Infestation with this parasite may be heavy, and is usually associated with loss of condition and, occasionally, fits. Demodectic mange mites (*Demodex canis*) and fleas (*Ctenocephalides canis*) may also be troublesome.

Broncho-pneumonia caused by lungworms (*Crenosoma vulpis* and *Capillaria aerophila*) is a common cause of death. *Cr.v.* passes its intermediate stage in various snails, and preventive measures should be aimed at the elimination of these vectors. Ascarid worms, hookworms and tape worms also cause losses.

The following diseases are also dealt with in the paper:—"paratyphoid disease" caused by *Salmonella enteritidis* (dublin), leptospiral jaundice, and

encephalitis. In the discussion following the paper, hygienic measures for the control of parasitic infestation constituted the chief topic.—D. L. HUGHES.

- (1938). **Report of the Committee on Transmissible Diseases of Poultry [U.S. Live Stock Sanit. Ass.]**.—*J. Amer. vet. med. Ass.* **92**. 425-429.

Recommendations are made in this report concerning the field control of pullorum disease, on certain respiratory and nutritional disorders, and on the lines along which the problem of adult mortality can be investigated. Besides discussing recent technical developments, the report reviews several diseases with a view to emphasizing the necessity of the closest co-operation between the farmer, the field advisors and the veterinary laboratory.—GEOFFREY B. BROOK.

- HINSHAW, W. R. (1938). **Diseases of Turkeys**.—*Bull. Calif. agric. Exp. Sta.* No. 613. pp. 112. 56 figs.

This publication covers a very comprehensive list of diseases that may affect turkeys. It is well illustrated and should be of great value to all interested in the subject. The original should be consulted for details.—W. J. IRONSIDE.

- SCHÄPER, W., & WEISCHER, F. (1938). Entstehung und Bekämpfung des Hufkrebses im Lichte der Konstitutionsforschung. [**Canker of the Hoof in the Light of Research on Constitution**].—*Tierärztl. Rdsch.* **44**. 216-222 and 234-238. [Numerous refs.]

The aetiology of hoof canker is not known; it consists essentially in a parakeratosis. About 20% of cases were found by WESTHUES [*V. B.* **8**. 718.] to respond to treatment with pressure bandages alone. The annual loss from the disease in Germany has been estimated at 5.75 million reichmarks.

Evidence is given which suggests a definite influence of heredity on the incidence of canker, so that various exogenous causes—moisture, irritation due to foul stall conditions, etc.—acting on a basis of hereditary predisposition produce the disease. The breeding history of certain stallions is cited in support of this view.

It is recommended that all stallions and mares which have at any time shown evidence of hoof canker should be debarred from use in breeding. This procedure, together with improved hygienic conditions, is said to afford the only hope of eradication of the disease.—E. G. WHITE.

- TAGLIAVINI, A. (1938). Ueber die rezidivierende Uveitis des Pferdes. [**Periodic Ophthalmia in the Horse**].—*Arch. wiss. prakt. Tierheilk.* **73**. 66-70. [7 refs.]

Examination of 50 horses with periodic ophthalmia did not reveal the presence of any pathogenic organism, but in every case the thyroid glands were abnormal. The weight of the glands varied between 18 and 39 g., the follicular epithelium was flattened, and the follicles were filled with a compact colloid material containing numerous, pigmented, cornified flakes. This suggested that the animals were affected with a thyroid deficiency. Thyroid treatment was given to 38 horses showing the acute form of the disease, and in 36 of these animals no signs of the disease were present a year later. It is concluded that periodic ophthalmia is primarily a constitutional disease which does not appear unless there is a disturbance of thyroid function.—J. A. NICHOLSON.

- NIKOLSKII, M. (1937). K voprosy geografičeskogo rasproskranenja ikterogemoglobinurii krupnogo rogatogo skota. [**The Geographical Distribution of Icterohaemoglobinuria of Cattle**].—*Sovyet. Vet.* No. 5. pp. 38-39.

Occurring in the Lower Volga, this disease attacks calves from two weeks to

eight months old. The symptoms are blood in the urine and high temperature, and sometimes conjunctivitis and diarrhoea; it is similar to the Ukrainian form recorded, but differs from that of Northern Caucasia [*V. B.* 6. 882, and 7. 419]. P.M. examination reveals yellowing of the mucous membrane and subcutis. No blood parasites or spirochaetes were demonstrable by bacteriological methods, and the possibility of piroplasmosis was excluded by tests. A mild diet with frequent variation, daily attention, and segregation, are said to be the best control measures, but the disease spreads rapidly, with a high mortality. [Little information is given].

BUTOZAN, V. (1938). Raširenost hroničke hematurije goveda u Jugoslaviji. [**Chronic Bovine Haematuria in Yugoslavia**].—*Vet. Arhiv.* 8. 96-100. [Abst. from German summary]. [See also *V. B.* 8. 597].

A statistical note on the geographical incidence of C.B.H. in Yugoslavia. It is commonest in Bosnia, but occurs in all provinces; it is chiefly prevalent in hilly wooded districts, and has been seen in 27.5% of all the government districts of the country.

- I. JOHNNEN, F. J. (1938). Die Durchführung der planmässigen Unfruchtbarkeitsbekämpfung bei Stuten. [**The Campaign against Sterility in Mares**].—*Dtsch. Tierärztebl.* 5. 189-191.
- II. KARSTEN. (1938). Ueber die Organisation der planmässigen Bekämpfung der Unfruchtbarkeit der Stuten. [**The Campaign against Sterility in Mares**].—*Ibid.* 191-193.
- III. KRAMPE. (1938). Das obligatorische Sterilitätsbekämpfungsverfahren bei Stuten. [**The Obligatory Campaign against Sterility in Mares**].—*Ibid.* 193-195.

I. When a campaign is carried out it must by law apply to a complete breeding area and be carried out by practising veterinary surgeons under the direction of an organizer. All mares and stallions must be examined before being passed for breeding in order to prevent spread of infection and to improve the stock by elimination of those unfit. Stallions should not be overfed and must be given sufficient physical exercise. The service season should be extended and clinical diagnosis of pregnancy should be a routine procedure.

II. Recommendations are given regarding the care of stallions; the practice of many owners to allow their stallions to serve too many mares during the breeding season is condemned. The causes of sterility in mares are classified.

III. The use of clinical and especially of biological methods of diagnosis of pregnancy are discussed in relation to a compulsory campaign against sterility in mares.—A. T. PHILLIPSON.

ORR, W. (1938). **Observations on Contagious Granular Vaginitis in Southern Rhodesia**.—*Vet. J.* 94. 184-199. [Numerous refs.]

In the course of this work, which deals with the subject in considerable detail, many of the older conceptions of the disease are refuted. While the exact aetiology of the condition is still obscure, two things seem certain—the disease is not of a serious nature and, moreover, it is of little or no moment as a cause of sterility. In addition, it does not appear to be related in any way to contagious abortion, although some workers have sought to prove such a relationship.

Calves are most severely affected; in adults the disease is generally benign. The importance of the bull in transmitting the disease to adults has been greatly exaggerated. O. considers that the condition may be infective and that infection

may be *via* the alimentary route. Medical treatment of the condition is only justified on rare occasions, and even then great care must be exercised, or dangerous sequelae may result.—D. D. OGILVIE.

VELU, H. (1988). Silicose pulmonaire et dunes de sable. [**Pulmonary Silicosis in Sheep Caused by Sand**].—*C. R. Soc. Biol. Paris*. **128**. 13-14. 1 table. [1 ref.]

A short note on the occurrence of pulmonary silicosis in Moroccan sheep. A chemical analysis of the lungs of sheep obtained from the abattoirs of Casablanca showed that lungs of adult sheep from the desert regions contained a high proportion of silica as compared with those of lambs from the same regions or of adult sheep from outside the desert areas.—N. J. SCORGIE.

- I. PREIN, W. (1937). Stipafrüchte in der Haut eines Schafes. [**Grass Seeds (*Stipa* sp.) in the Skin of a Sheep**].—*Dtsch. tierärztl. Wschr.* **45**. 829-830.
- II. LÁSZLÓ, F. (1937). Durch *Stipa capillata* verursachte pathologische Veränderungen. [**Skin Changes Caused by *St. capillata***].—*Ibid.* 830-831.
- III. OVERBECK, F. (1937). Die Früchte von *Stipa* (*Pfriemengras*) als Bohrkletten. [**The Penetrative Powers of the Fruits of *Stipa***].—*Ibid.* 831-832. 3 figs. [4 refs.]

I. Approximately 60 seeds of *St. orientalis* were found embedded in the adipose tissue and musculature in the umbilical region of a sheep slaughtered at Isfahan, Iran; there was no evidence of any tissue reaction on macroscopic examination. The seeds, which are torpedo-shaped and very hard, are 6-12 mm. long and 0.5 mm. wide.

II. Penetration of the seeds of *Stipa* sp. into the skin and superficial muscles of sheep is recorded in Hungary, the seeds being embedded in a capsule of connective tissue. The condition was common in sheep in the agricultural conditions prevailing in Hungary during the 19th century, but records of its occurrence during recent years are rare.

III. The structure of the seeds of *Stipa* sp. is described with illustrations. The penetrative powers of the seeds are said to have caused serious losses in sheep in parts of Morocco, Australia, Argentina and Uruguay. Various parts of the alimentary tract may be penetrated and, in cases in Australia [referred to in ULLRICH (1928). "Biologie der Früchte und Samen"], the seeds have been known to reach the heart musculature. Animals other than sheep are occasionally affected.—E. G. WHITE.

McILWAINE, J. E. (1988). **Facial Eczema in Sheep. Possibility of a Recurrence of the Disease**.—*N. Z. J. Agric.* **56**. 97-98. 2 figs.

The 1935 outbreak of facial eczema is described in order to warn farmers against a possible recurrence of the disease. The essential cause of the condition is considered to be a sudden change of diet, as in the outbreak instanced, where rain brought a heavy flush of grass after a long drought. The disease can be prevented by supplying green feed during drought and, conversely, dry feed during flush periods.—D. D. OGILVIE.

BRADSHAW, M. W. (1988). **Sunburned Calf**.—*Vet. Med.* **33**. 275. 1 fig.

In a herd of Holstein cattle in California, exposed to the direct rays of the sun, the white parts of the skin became affected due to photosensitization. The initial sensitization in this instance was ascribed to the ingestion of burr-clover.—D. D. O.

MINTSCHEFF, P. (1938). Ueber die Lähmung und Unterbrechung der Sympathicusinnervation der Augengegend bei den Haustieren. [**Loss of Nerve Supply to the Orbital Region in Domestic Animals**].—*Arch. wiss. prakt. Tierheilk.* 73. 40-53. 4 figs., 1 table. [12 refs.]

In cats, section of the cervical sympathetic nerve was followed by a marked myosis and moderate persistent ptosis on the same side. In addition, the membrana nictitans was protruded across the eye, which became retracted, there was a secretion from the lachrymal gland and the lower lid was slightly raised. Vasomotor effects were also produced. Section of both the sympathetic and vagus produced a moderate myosis and ptosis, with slight protrusion of the membrana nictitans, whereas division of the vagus alone caused marked myosis and closure of the eyelids, which passed off after 24 hours.

Dogs behaved similarly to cats, but in horses and cattle section of the cervical sympathetic was followed by dilatation of the pupil and closure of the upper eyelid, as in sleep. Opacity of the cornea set in some days after the operation. Section of the vagosympathetic trunk produced the same effects. The difference between the effects of section of the sympathetic nerve in carnivora and herbivora is due to the fact that in the former the main sympathetic supply of the eye runs directly from the cervical sympathetic, whilst in the latter the main sympathetic supply comes directly from the hypothalamus. In conclusion, the clinical applications of these findings are discussed.—J. A. NICHOLSON.

DOYLE, L. P., & BULLARD, J. F. (1938). **Difficult Swallowing in a Horse.**—*J. Amer. vet. med. Ass.* 92. 564-566. 2 figs.

A five-year-old horse showing uncomplicated symptoms of dysphagia was slaughtered. No gross lesions were apparent on autopsy, but microscopic changes were discovered in the petrous ganglion of the glossopharyngeal nerve. These consisted chiefly of degeneration of the ganglion cells and a well-marked infiltration with round cells. It is suggested, therefore, that the condition was of infective rather than toxic origin.—D. D. OGILVIE.

SUTHERLAND, G. F., & CURTIS, Q. F. (1938). **Myotonia Congenita in the Goat.**—*Proc. Soc. exp. Biol., N.Y.* 38. 460.

Investigations with faradic current on the muscles of so-called "stiff-legged" goats showed that the condition thought to be a general tonic spasm was a failure of individual muscles to relax normally after stimulation. Repeated stimulation shortens the relaxation period till it approaches normal. The anomaly is hereditary.—D. D. OGILVIE.

LÁSZLÓ, F. (1938). Ueber die Muskelhypoplasie des Schweines. [**Muscular Hypoplasia in Swine**].—*Dtsch. tierärztl. Wschr.* 46. 369-371.

Two cases of fatty degeneration of the muscles of pigs are recorded. In both cases the degeneration was complete and histological examination showed that the contractile part of the muscle fibres had become converted completely or partially into adipose tissue. The sarcolemma was present and the connective tissue was normal.

It is suggested that the causes of the degeneration originated during embryonic life and might be referred to faulty development of the blood supply through pressure or some other cause which interfered with the normal metabolism of the developing muscle. This would give rise to transitional tissue which is more likely to develop into adipose tissue than normal muscle. The muscles generally affected in pigs are those of the back.—T. A. NICHOLSON.

HADWEN, S. (1937). **The Melanomata.**—*J. comp. Path.* 50. 293-296. 9 figs. on 2 plates. [4 refs.]

A brief account of H's previous work [*V. B.* 2. 308.] relative to modern conceptions of melanin production. Melanin was produced artificially in rabbits by injection of diphtheria toxin. A growth of black hair resulted around the needle punctures.—E. G. WHITE.

KRAUSE, C. (1938). Ueber das Leberadenom und den Leberkrebs der Rehe, mit besonderer Berücksichtigung der Histogenese. [**Adenoma and Cancer of the Liver in Roe Deer**].—*Arch. wiss. prakt. Tierheilk.* 73. 1-24. 6 figs. [18 refs.]

Primary epithelial tumours are said to be common in deer; 15 cases are described, including eight encountered by K. Affected animals were more than five years old.

The tumours are usually single, and produce secondary deposits in the local lymph nodes and lungs. Necrosis, haemorrhage and thrombosis are common.

The histological features are similar to those of liver neoplasms in man, both bile duct and liver cell types being found. It is suggested that the frequency of severe strongyle infestation of the stomach and intestines may be in some way related to the high incidence of these tumours.—E. G. WHITE.

FITCH, L. W. N. (1938). **Fowl Leucaemia (or Fowl Leucosis).**—*N. Z. J. Agric.* 56. 259-262. 5 figs.

The occurrence in New Zealand of a myelogenous form of leucaemia is recorded. The condition has been transmitted by inoculation of liver emulsions.

HOLE, N. H. (1937). "**Russell Bodies**" or **Hyaline Droplet Degeneration of Plasma Cells in the Portal Canals of the Sheep's Liver.**—*J. comp. Path.* 50. 299-302. 3 figs. [6 refs.]

The hyaline granules first described by RUSSELL in tumour cells, and believed by him to be the aetiological agent of cancer, are now known to represent a form of hyaline droplet degeneration. A few references to their occurrence in animal tissues have appeared.

The granules are here described as occurring within plasma cells in the portal tracts of the liver of sheep, there being no definite indication of their significance. They have not been found in the liver of human beings, horses, pigs or dogs.  
—E. G. WHITE.

REICHLF, H. S. (1938). **Bronchiogenic Distribution of Fluid and Particulate Matter. Its Site of Predilection and the Mechanism of Transfer.**—*Arch. Path.* 25. 811-818. 5 figs. [6 refs.]

Fifty cases of pulmonary tuberculosis or pneumoconiosis in human beings, in which the lesions were predominant in restricted areas, were examined and in 27 cases the lesions were confined to a "transverse band area", extending across each lung. On the assumption that these lesions were due to bronchiogenic distribution, indian ink was injected in small quantities into the trachea of g. pigs and rabbits. The animals were killed by ether inhalation a few minutes after injection, and the pigment was found to be deposited in the transverse band area. Animals exposed to a charcoal-laden atmosphere showed diffuse pigmentation of the lungs. The examination of serial sections of rabbits treated with indian ink suggested that the grooves on the lateral surface of the bronchi are the cause of this lateral shunting of fluid or particulate matter in suspension.—A. T. PHILLIPSON.

## NUTRITION IN RELATION TO DISEASE

- THOMAS, A. D., & VAN DER WATH, J. G. (1937). **Bone Biopsy as an Aid to the Study and Diagnosis of Deficiency Diseases.**—*Onderstepoort J. vet. Sci.* 8. 481-489. [2 refs.]

The usual procedure when studying the effect of deficient diets on animals is to observe the changes which take place in the body generally, and the bones in particular, of animals in experiment which have died or have been killed. The method of studying portions of bone removed from the animals during life, usually a portion of one rib, has many advantages, can be applied to any animal species, and is a great saving in material; the bone changes at different stages of an experiment can be studied.—E. M. ROBINSON.

- HART, G. H. (1938). **Dietary Deficiencies and Related Symptomatology in Domestic Animals.**—*J. Amer. vet. med. Ass.* 92. 508-517. [8 refs.]

This is a general article concerning the place of nutrition with regard to animal health, and deals with the various diseases arising from a deficient intake of minerals and vitamins. It is pointed out that the rations of cattle and sheep, particularly under range conditions, are often low in P, but rich in Ca, whereas those of pigs and poultry subsisting largely on concentrates are rich in P, but low in Ca. Other mineral deficiencies discussed are those of Fe and its associated elements, and of iodine. The various diseases in the domestic animals arising from deficiencies of vitamins A, D, E and G are dealt with.—N. J. SCORGIE.

- WHALLEY, Muriel E. (1937). **Bibliography on the Influence of Mineral Deficiencies on Growth and Reproduction of Farm Animals.** pp. 89. Ottawa: National Research Council of Canada. [4to] [Mimeographed] [50 cents].

This is a list of 987 references to the literature on mineral deficiency in farm animals published up to the end of 1936. They are arranged alphabetically under the authors' names, with a subject index at the end.

- METZGEN, H. J., & MORRISON, H. B. (1937). **The Occurrence of Milk Fever in the Kentucky Station Herd over a Period of Twenty Years.**—*Proc. Amer. Soc. Anim. Prod.* 1936. pp. 48-52.

During the long period of observation the herd of 218 cows of breeding age consisted mainly of Jerseys, together with some Holsteins, Guernseys and four cross-breeds. The records showed that there was an increase in the number of cases of milk fever during the winter and that the Jerseys were more susceptible than the other breeds.—R. ALLCROFT.

- ANTIGNAC, J. F. A. (1934). **Contribution à l'étude de la tétanie d'herbage des bovidés. [Grass Tetany in Cattle].**—*Thesis, Alfort.* pp. 111. [Num. refs.]

Clinical notes are given on nine cases of bovine grass tetany, and the somewhat speculative conclusions are based on these.

It is considered that grass tetany is primarily a disease of milking cows, most common in older animals exhausted by many parturitions, and that it is due to bad feeding, with an excess of protein food and a shortage of minerals. The excess protein results in great absorption of nitrogenous products at varying stages of breakdown, which interferes with proper absorption and reacts *via* the endocrine and sympathetic-nervous mechanisms on the mineral metabolism.

Ca and Mg therapy are recommended, and also a more balanced winter ration, with a gradual transition from stall to pasture feeding.—R. ALLCROFT.

- I. HUFFMAN, C. F., & DUNCAN, C. W. (1936). **Magnesium Carbonate and Magnesium Oxide Supplements to a Whole Milk Ration for Dairy Calves.**—*J. Dairy Sci.* **19**. 440-441.
- II. KNOOP, C. E., KRAUSS, W. E., SUTTON, T. S., & WASHBURN, R. G. (1937). **Iron and Copper in a Normal Calf Ration.**—*Bi-m. Bull. Ohio agric. Exp. Sta.* No. 188. pp. 129-135. 8 tables. [1 ref.]
- III. SAMPSON, J., BOLEY, L. E., & GRAHAM, R. (1938). **Losses of Newborn Calves Presumably the Result of Feeding Dams Rations Inadequate for Reproduction.**—*Cornell Vet.* **28**. 53-57. 1 table. [7 refs.]

I. It has been previously shown [*V. B.* **7**. 252.] that calves fed a whole-milk ration often manifest tetany associated with subnormal plasma magnesium. In this respect the authors state that there appears to be considerable variation in the magnesium requirement of calves, but that 15-20 mg. of the oxide or carbonate of magnesium per lb. body weight prevents the onset of tetany when the calves are fed on an experimental diet otherwise free from magnesium.

II. This study indicates that the feeding of extra Cu and Fe to calves receiving milk, alfalfa or mixed hay, and grain, probably has no beneficial effects. According to this work a calf ration, on a dry basis, which contains 0.0176% Fe and 0.0013% Cu furnishes adequate amounts of these minerals for normal growth up to 8½ months of age.

III. This is a case report describing the loss of 84 new-born calves in a large herd kept under range conditions. Symptoms developed 5-6 hours after birth and consisted of profuse diarrhoea, anorexia, and death within 24 hours after the onset of symptoms. Treatment of affected animals was useless. P.M., the livers of six out of 13 calves examined showed extreme fatty infiltration. Biochemical and bacteriological examinations of the tissues were negative. The evidence indicated that the diet of the dams was low in vitamin A and in minerals, and this is supported by the fact that the calf mortality ceased when the cows were provided with grain, hay, protein, mineral supplement and rye pasture.—N. J. S.

- I. ASKEW, H. O., & MAUNSELL, P. W. (1937). **The Cobalt Content of some Nelson Pastures.**—*N.Z. J. Sci. Tech.* **19**. 337-342. 4 tables. [5 refs.]
- II. DIXON, J. K. (1937). **A Trial of the Effect of Cobalt Drench on Milk Production of Cows at Morton Mains.**—*Ibid.* 343-344. 2 tables. [3 refs.]
- III. JOSLAND, S. W., & McNAUGHT, K. J. (1938). **Further Observations on the Production of Cobalt Polycythaemia in Rats.**—*Ibid.* 536-540. 2 figs., 4 tables. [7 refs.] [See also *V. B.* **7**. 249].

I. Data are presented for the cobalt content of several Nelson pasture samples throughout the year. Top-dressing with cobalt chloride at rates from 2-112 lb. per acre markedly increased the cobalt content of pasture.

II. Cobalt drenches to cows in a sick area had no beneficial influence on the milk yield.

III. Of eight rats which received 1 mg. of cobalt daily in a stock diet, only one developed a persistent polycythaemia. Some haemopoietic stimulation occurred in the remaining animals early in the experiment, but this effect was not sustained. Confirmatory evidence of storage of cobalt by cobalt-fed rats was obtained, the organs mostly affected being the liver, spleen, and kidneys.

—L. W. N. FITCH.

HOPKIRK, C. S. M., & GRIMMETT, R. E. R. (1938). **Importance of Cobalt. Relationship to the Health of Farm Animals.**—*N.Z. J. Agric.* **56**. 21-24. 1 fig., 1 table.

Limonite has been used widely and successfully to prevent sickness supposedly due to cobalt deficiency and variously called "bush sickness", "enzootic marasmus", etc. The cobalt content of limonite was found to vary to such an extent in different samples that a cobaltized salt lick of known concentration is now preferred. As an alternative, cobalt may be given in drench form. It was found that sheep became sick on pasture containing less than 0.07 p.p.m. cobalt, while cattle remained healthy on pasture in which the cobalt level was as low as 0.04 p.p.m. Healthy pastures contained from 0.07 to 0.3 p.p.m. cobalt.

Zones of incidence of "bush sickness" are outlined and the influence of topography and stock management is discussed.—L. W. N. FITCH.

FERGUSON, W. S., LEWIS, A. H., & WATSON, S. J. (1938). **Action of Molybdenum in Nutrition of Milking Cattle.**—*Nature, Lond.* **141**. 553. [2 refs.]

Spectrographic analysis of "teart" pastures in Somerset showed a much higher Mo content than for "non-teart" areas, but there was no apparent correlation between total or HCl-soluble Mo in soil as compared with herbage. Feeding soluble Mo salts to five dry cows at the rate of 1.36 g. Mo per head per day [estimated level of Mo ingestion on certain pastures] resulted in three animals showing loss of condition and extreme scouring, resembling the natural "teart" symptoms. The mode of action of Mo is unknown.—ALFRED EDEN.

ALDEA, L. A. (1935). **A Study of the Consumption of Salt by Range Cattle.**—*Philipp. Agric.* **24**. 595-609. 1 fig., 7 tables. [9 refs.]

The amount of salt consumed by three groups of range cattle was measured over a period of 17 months. In all, 55 animals were used, and the average consumption of salt per head was 0.77 kg. over a period of four weeks (10.3 kg. per year). The figures showed no definite seasonal variation. In all groups, the amount of salt consumed during the first month of the experiment was greater than at any other period.—A. T. PHILLIPSON.

PECK, E. F. (1938). **The Relationship of Salt Starvation to Contagious Necrosis and Lameness in Camels. (A Preliminary Note).**—*Vet. Rec.* **50**. 409-410. 1 graph.

This is a summary of clinical observations made on contagious necrosis of the skin and obscure shoulder and hip lameness of camels in Somaliland. The usual daily salt (crude coastal natural deposit) ration of 1-2 oz. fed to camels would appear to be inadequate; if allowed salt *ad lib.* camels were found to consume an average of 4.3 oz. daily. When 5 oz. were given daily in the feed there was great diminution in the incidence of the above two conditions, together with a striking improvement in the general condition of the camels.—N. J. SCORGIE.

MCCANCE, R. A. (1938). **The Effect of Salt Deficiency in Man on the Volume of the Extracellular Fluids, and on the Composition of Sweat, Saliva, Gastric Juice and Cerebrospinal Fluid.**—*J. Physiol.* **92**. 208-218. 7 tables. [Numerous refs.]

Salt deficiency, produced by diet or by sweating, caused a decrease in the sodium and an increase in the potassium content of both the saliva and the gastric juice; in the latter the free and total acidity and chlorides showed variable reductions or little change. The sodium and chloride content of the cerebrospinal fluid was lowered and that of the extracellular body fluids was reduced by 28-38%.

—A. T. PHILLIPSON.

TURPEINEN, O. (1938). **Studies on Sodium Deficiency. The Effects of Sodium Deprivation on Young Puppies.**—*Amer. J. Hyg.* 28. 104-110. 1 fig., 1 table. [9 refs.]

Three young puppies, fed on a ration containing 0.011 % of sodium but otherwise satisfactory, showed a steady loss in weight, relatively poor appetite, and dryness of the skin with a tendency to lose hair. They survived on this diet for about eight weeks and then died of cachexia. The one control animal used was given 0.88 % of sodium and kept under observation for 11 weeks.

Blood analyses showed a decrease in the Na values of the three experimental puppies, but there were no marked changes in the K, Ca, Mg and inorganic P values. The non-protein nitrogen showed a definite premortal rise, but was otherwise normal. Electrocardiographic studies demonstrated no significant changes.—R. ALLCROFT.

BUSSABARGER, R. A., FREEMAN, S., & IVY, C. A. (1938). **The Experimental Production of Severe Homogenous Osteoporosis by Gastrectomy in Puppies.**—*Amer. J. Physiol.* 121. 137-148. 7 figs., 4 tables. [11 refs.]

When the stomach is removed from growing puppies which are fed on a diet adequate for normal animals, the bones do not ossify to a normal extent. The homogeneous osteoporosis thus produced is so severe that bony deformities and even spontaneous fractures result, giving a picture analogous to that observed clinically in severe cases of coeliac disease without rickets. The deficient ossification is apparently due to a combination of three factors:—(1) the absence of HCl, which normally renders the less soluble Ca salts more soluble and assists in the maintenance of an acid reaction in the intestine; (2) the absence of the reservoir function of the stomach, so that the speed of intestinal transport of food substances is increased, and (3) the presence of a postcibal acidosis, which tends to decrease Ca retention.—R. ALLCROFT.

WOLF, H. J., & TSCHESCHE, R. (1937). **Die Milchanämie junger wachsender Ratten als Test für die antianämische Wirksamkeit von Leberpräparaten. [Milk Anaemia in Young Rats as a Test for the Anaemic Value of Liver Extract].**—*Hoppe-Seyl. Z.* 248. 21-33.

A severe anaemia was produced by feeding young rats on a diet consisting of cows' or goats' milk. The haemoglobin content of the blood fell from 65 % to 15 %, the erythrocyte count from over six million to four million and the leucocytes from 8,000 to 4,000, within six weeks of their being put on the milk diet. The anaemia was thus of the hypochromic type, and injections of liver extract did not effect any change in the haemoglobin, but both the erythrocyte count and the leucocyte count returned to a normal value. Injection of copper sulphate did not produce any change in the blood picture, but the haemoglobin, erythrocyte and leucocytes quickly rose to normal after dosing with iron salts.

In the light of the above findings, the usefulness of young rats suffering from milk anaemia as test animals for gauging the therapeutic value of liver extracts appears to be limited, and the authors discuss this very fully.—JAMES STEWART.

BIRD, H. R., & OLESON, J. J. (1938). **Effectiveness of Chondroitin as the Anti-Gizzard Erosion Factor Required by Chicks.**—*J. biol. Chem.* 123. xi-xii.

Pig's lung has been found to be a good source of the anti-gizzard erosion factor, but attempts at concentration have not been successful, although reticulin, a potent preparation of connective tissue protein, was obtained. The authors

then experimented with other types of connective tissue. Beef tendon and yellow elastic connective tissue gave doubtful results, but excellent protection followed the feeding of 10% cartilage.

Chondroitin, used in the treatment of gastric ulcer in man, was fed as 8-4% of the ration, and had a marked protective action against gizzard lesions. Purified extracts appeared to be more potent than crude chondroitin. Active preparations were obtained by alkaline extraction or by 10%  $\text{CaCl}_2$  extraction of cartilage. Experiments are now being made to determine the effectiveness of fractions of the chondroitin molecule and of related compounds. Glucosamine and glucuronic acid were found ineffective at relatively low levels. Galactose fed as 8% of the ration was not active.

SCORGIE, N. J. (1938). **The Role of Vitamins in Animal Nutrition. A Brief Survey.**—*Vet. Rec.* 50. 775-787. 1 table. [Numerous refs.]

The functions of vitamins and their relation to health are discussed, and the distribution of vitamins in the commoner feeding stuffs is conveniently summarized in a table. Since cod liver oil, a rich potential source of vitamins A and D is often sold adulterated with other oils, or else is of inferior quality, the importance of feeding grades of guaranteed potency is emphasized.—ALFRED EDEN.

PHILLIPS, P. H., & BOHSTEDT, G. (1938). **Effects of a Bovine Blindness-Producing Ration on Rabbits.**—*J. Nutrit.* 15. 809-819. 8 figs. [12 refs.]

The experiments reported showed that rabbits did not develop stenosis of the optic foramen when fed a ration known to produce this condition in calves. Apart from this, the symptoms developing in the two species were strikingly similar, e.g., blindness and xerophthalmia, nervous disturbances, and failure to grow. Symptoms could be prevented or cured in rabbits by feeding adequate quantities of carotene or vitamin A. It is suggested that the causative factor in calves is likewise a deficiency of vitamin A in the diet.—N. J. SCORGIE.

ELVEHJEM, C. A., & KOEHN, C. J., Jr. (1935). **Studies on Vitamin  $\text{B}_2$ (G). The Non-Identity of Vitamin  $\text{B}_2$  and Flavins.**—*J. biol. Chem.* 108. 709-728. 1 fig., 5 tables. [Numerous refs.]

Experiments are described attempting the isolation of vitamin  $\text{B}_2$ , using the production of symptoms of pellagra in the chick for the assay. Data are included on the solubility in various reagents, precipitation reactions, and stability of the vitamin. Concentrates rich in flavins or lumiflavin prepared from autolysed liver and liver extract proved completely inactive in the prevention of pellagra in chicks, and it is concluded that vitamin  $\text{B}_2$  is a chemical entity, separate and distinct from hepatoflavin.—R. ALLCROFT.

BIRCH, I. W., GYÖRGY, P., & HARRIS, L. J. (1935). **The Vitamin  $\text{B}_2$  Complex. Differentiation of the Antiblacktongue and the "P.P." Factors from Lactoflavin and Vitamin  $\text{B}_6$  (So-called "Rat Pellagra" Factor). Parts I-VI.**—*Bio-chem. J.* 29. 2830-2850. 13 figs., 5 tables. [Numerous refs.]

It is concluded from the experimental work described, that the human pellagra-preventing ("P.-P.") factor differs both from vitamin  $\text{B}_6$  and from lactoflavin (two known components of the vitamin  $\text{B}_2$  complex), and, therefore, that the "P.-P." factor should be regarded as a third component. The canine anti-blacktongue factor is also different from vitamin  $\text{B}_6$  and lactoflavin. It was found that dogs lost weight and developed blacktongue, with symptoms including

diarrhoea and anaemia, when fed on a Goldberger maize diet containing large amounts of vitamin B<sub>6</sub>, and the addition of lactoflavin had no curative action. Symptoms were prevented or cured by the addition of supplements of autoclaved yeast, fresh fish (containing negligible lactoflavin), or Eli Lilly liver powder 348 (containing negligible vitamin B<sub>6</sub>). The anti-blacktongue factor may be identical with the human "P.-P." factor, but evidence is so far not conclusive. Dogs kept on "synthetic" diets, containing vitamin B<sub>1</sub> and lactoflavin, appear to need supplements of two further factors, one contained in maize (presumably vitamin B<sub>6</sub>) and one in liver extract ("P.-P." or anti-blacktongue factor). It is supposed that the addition of maize to the diet helps in the production of regular symptoms of blacktongue, not so much because of a toxin present in it, but because in its absence the dog may sometimes develop vitamin B<sub>6</sub>-deficiency instead of blacktongue. So-called "chicken pellagra" of ELVEHJEM and KOEHN [p. 40] appears to be distinct from vitamin B<sub>6</sub>-deficiency, and its relation to human pellagra and blacktongue is undecided.

The extrinsic factor for pernicious anaemia also appears to be different from lactoflavin or vitamin B<sub>6</sub>.—R. ALLCROFT.

**STREET, H. R. (1937). Production of Canine Blacktongue on Purified Diets.—***Proc. Soc. exp. Biol., N.Y.* **36**. 602-609. [7 refs.]

Typical oral symptoms of blacktongue occurred in four dogs fed on a basal ration complete except for B vitamins but supplemented by a vitamin B<sub>1</sub> concentrate, while control dogs receiving the same ration with 6% autoclaved yeast added, remained healthy. These results confirm those of BIRCH, GYÖRGY and HARRIS [above] and so far there is little question that blacktongue involves in its aetiology a lack of some water-soluble dietary factor or factors found in the so-called vitamin B complex and distinct from vitamins B (B<sub>1</sub>) and G (B<sub>2</sub>).—R. ALLCROFT.

**GUERRANT, N. B., MORCK, R. A., BECHDEL, S. I., & HILSTON, N. W. (1938). Storage of Vitamin D in the Tissues of Growing Calves.—***Proc. Soc. exp. Biol., N.Y.* **33**. 827-831. 1 table. [5 refs.]

An investigation on the storage of vitamin D in the blood and in the liver of young calves fed definite quantities of vitamin D in the form of cod liver oil concentrate or irradiated yeast for 164-210 days, showed that only a relatively small percentage of the antirachitic intake of the calf is stored in the blood and liver. The concentration of the vitamin per unit of weight was found to be approximately equal in the two tissues studied, but unless there are other tissues which serve as more efficient storage organs than the liver or the blood, the ability of the calf to store vitamin D appears rather limited.—R. ALLCROFT.

**I. TELFORD, I. R., EMERSON, Gladys A., & EVANS, H. M. (1938). Claim for Thyroid Subnormality in Vitamin E-Low Rats.—***Proc. Soc. exp. Biol., N.Y.* **38**. 623-624. [6 refs.]

**II. KNOWLTON, G. C., & HINES, H. M. (1938). Effect of Vitamin E Deficient Diet upon Skeletal Muscle.—***Ibid.* 665-667. 1 table. [5 refs.]

I. No histological subnormality of the thyroid was observed in the paralysed suckling young of vitamin E-low dams or in old animals (22 months of age) chronically deprived of vitamin E. Nor was it possible to detect any functional subnormality of the thyroid since the oxygen consumption of four normal rats and four vitamin E-low rats did not differ significantly.

II. A study of the functional capacity of the gastrocnemius muscles of adult rats reared on a vitamin E-deficient diet showed that dystrophic changes occurred

within six months. This was evidenced by a decreased maximal contractile power, and decreased creatine and increased chloride concentration of the muscles. Males were affected to a greater extent than females. These changes were associated with only minor histological changes and occurred without the appearance of gross symptoms. Addition of wheat germ oil to the diet gave complete protection against this muscle dystrophy.—R. ALLCROFT.

## PUBLIC HEALTH

KOLBE, F. (1937). *Neueres über Fleischvergifter und Fleischvergiftungen III. [Recent Advances in Meat Poisoning. III].—Z. Fleisch- u. Milchhyg.* 47. 439-442 and 456-458.

This review, of which part I appeared in 1931 and part II in 1932, covers all aspects of meat poisoning and research on meat poisoning organisms. It is valuable for reference purposes, but cannot be abstracted, as it is already very condensed. —J. E.

TOBEY, J. A. (1937). *Recent Court Decisions on Milk Control (1934-37).—Publ. Hlth Rep., Wash.* 52. 1038-1044. [Numerous refs.]

A series of court decisions in the U.S.A. concerning the validity of laws, ordinances, regulations, etc., relating to the pasteurization of milk, compulsory tuberculin testing of cattle, the liability of a milk dealer for a case of undulant fever caused by his milk supply, the imposition of fees for the inspection of dairy cattle, the rights of milk dealers in obtaining licences, the improper use of milk bottles, and the fixation of milk prices.—GWILYM O. DAVIES.

## THERAPEUTICS

TRÉFOUEL, J. (1938). *De la chimiothérapie anti-protazoaires à la chimiothérapie anti-bactérienne. [Chemotherapy of Bacterial and Protozoan Diseases].—Bull. Inst. Pasteur.* 36. 385-410.

A very good review of the development of chemical agents capable of killing protozoa and bacteria in the living body. The early work on dyes (trypanred) and the idea of a therapeutic coefficient was followed by the fundamental work of EHRLICH on the arsenobenzols. Antimony derivatives and other dyes were then studied, and the importance of certain chemical groups in definite positions, and of certain linkages on activity and toxicity, was determined. All these substances, however, were active only against protozoa and spirochaetes, and not against bacteria. Though MORGENROTH obtained interesting results with optoquine against bacteria, a further fundamental advance in bacterial chemotherapy was reached with the work of DOMAGK on prontosil. T. then describes the brilliant investigations of the French workers resulting in the discovery that the activity of prontosil is due to the simple substance p-aminobenzene-sulphonamide, which is liberated in the body from prontosil. The remarkable similarity in the chemical structure of sulphonamide and of various antimonial anti-protozoal agents (e.g., atoxyl, stibamine) is stressed. The numerous investigations into the effect on chemotherapeutic activity and toxicity of changing various side chains are described, and here again certain positions and groups are extremely important. Thus the SO<sub>2</sub> group appears to be of paramount importance in the activity ;

though at first it was believed that it would kill only haemolytic streptococci, it is now realized that effects on a variety of other organisms (meningococci, gonococci, etc.) can be produced. Lastly the fate of sulphonamide in the body is briefly discussed. T. includes a list of the various trade names under which p-amino-benzene-sulphonamide is sold.—J. M. ROBSON.

- I. KLEIN, L. A., SCHEIDY, S. F., KLECKNER, A. L., & CRAIGE, A. H. (1938). **Studies of Sulphanilamide Action on the Cow : Preliminary Report.**—*Vet. Ext. Quart. Univ. Pa.* **38**. No. 70. 10-28. 5 tables. [5 refs.]
- II. MCCOY, O. R. (1938). **Infectiveness of Sulfanilamide in the Treatment of Trichiniasis in Rats.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 461-462. 1 table. [4 refs.]
- III. OTTENBERG, R., & FOX, C. L., Jr. (1938). **Explanation for the Cyanosis of Sulphanilamide Therapy.**—*Ibid.* 479-481. 2 tables. [3 refs.]

I. The physiological effects of oral dosage of cows with sulphanilamide are increased temperature, diarrhoea, loss of appetite and decreased milk yield. An initial dose of 30-45 g. followed by 15 g. 12 hours later and then 7.5-15 g. every 12 hours, was sufficient to maintain a blood concentration of sulphanilamide of 1 mg. or more per 100 ml. Owing to the small number of animals used, the results of the effect of sulphanilamide upon mastitis of the *Streptococcus agalactiae* type are insufficient to warrant general conclusions. Cows with a previous history of mastitis showed decrease in the leucocyte count and in the number of streptococci in the milk following dosing with sulphanilamide. In animals showing clinical symptoms of mastitis, the use of the drug led to an improvement in the physical appearance of the milk, but in no case did the infection clear up, nor was there any significant drop in the leucocyte count. Encouraging results were obtained in cows which showed latent infection.

II. Rats dosed with *Trichinella spiralis* larvae, and treated with 125 mg. sulphanilamide daily for 12-16 days, developed as heavy a muscular infestation as did untreated controls, indicating that sulphanilamide was of no value in the treatment of trichinosis in rats.

III. A brief exposure of sulphanilamide to ultra-violet irradiation causes a strong violet colour to develop, readily absorbed by red blood cells, and the ease with which this change is brought about suggests that some such transformation in the body is the cause of the cyanosis shown by patients undergoing sulphanilamide treatment.—ALFRED EDEN.

- I. JOHNSON, H. W., & MILLER, W. T. (1938). **Note on the Use of Sulfanilamide in the Treatment of Chronic Bovine Mastitis Due to Streptococci.**—*J. Amer. vet. med. Ass.* **92**. 548-555. 3 tables. [4 refs.]
- II. STABLEFORTH, A. W., & SCORGIE, N. J. (1938). **Entozon and Acriflavine for the Treatment of Chronic, Contagious Bovine Mastitis.**—*Vet. Rec.* **50**. 668-676. 1 fig., 11 tables. [Numerous refs.]

I. Sulphanilamide was given in the food twice a day, in one experiment six animals being given six doses of 75 grains and, in another, four animals receiving 16 doses of half an ounce. Bacteriological examination of the milk before and after the experiments showed that the treatment was without effect in all cases.

II. Treatment consisted in the relatively rapid injection of solutions of entozon or acriflavine into infected quarters.

In animals in milk, the solutions were allowed to remain for a short time (the "short" method), and the treatment was repeated at the end of a week. In dry animals, solutions were left in for 24 hours and with acriflavine one such treatment

only was given; with entozon the treatment was repeated after a week's interval. Entozon was used at a strength of 1 : 1,250 and acriflavine at 1 : 10,000.

With entozon, cures were obtained in nine out of nine experimentally infected quarters, 48 out of 60 quarters affected with latent mastitis, and 18 out of 87 clinically affected quarters; acriflavine cured 26 out of 29 quarters showing latent mastitis and nine out of 14 quarters clinically affected.—W. J. IRONSIDE.

GARROD, L. P. (1938). **The Chemotherapy of Bacterial Infections.**—*Lancet*.

**234.** 1125-1129 and 1178-1182. [Numerous refs.]

The present position in chemotherapy of sulphonamide derivatives is described in detail. The general scheme of dosage is reviewed and the mode of action discussed, with details of the experimental evidence which led to the conclusion that prontosil acts in the body by the liberation of sulphanilamide. The therapeutic value in various streptococcal, pneumococcal, staphylococcal, meningococcal and gonococcal infections, *Bacterium coli* infections of the urinary tract, and in various other conditions (*e.g.*, gas gangrene, typhoid, undulant fever, etc.) is reviewed. It is emphasized that specificity for individual bacteria varies with chemical structure, and that related compounds are at present being investigated for their actions on various organisms.—J. M. ROBSON.

MONET, P. (1938). Essai de traitement de la gastro-entérite infectieuse du chat par la carboxysulfamido-chrysoïdine. [**Treatment of Infectious Feline Gastro-Enteritis with Carboxysulphamido-Chrysoidine**].—*Thesis, Alfort*. pp. 81. [Numerous refs.]

The drug was given intramuscularly in 5% solution, and *per os* in tablets of 0.2 g. Usually 3-5 c.c. of the solution and one tablet were given every day. Convalescence was prolonged and the administration *per os* was continued during this period. The effect was not specific; 54% of the animals recovered, although the mortality is usually 80% or more in cases not treated with prontosil.—J. M. R.

LEVADITI, C., GIRARD, A., VAISMANN, A., RAY, A., & RICHARD, G. (1937). Sur le 4-nitro-4'-amino-diphénylsulfoxyde et son action dans la toxi-infection expérimentale de la souris. [**4-Nitro-4'-Amino-Diphenylsulphoxide and its Action on Toxi-Infections in Mice**].—*C. R. Acad. Sci., Paris*. **205**. 1018-1020. [6 refs.]

Mice were inoculated intraperitoneally with gonococcal cultures mixed with mucin. All such animals receiving 5 mg. of the drug survived indefinitely; with 1 mg., 80-90% survived; 40% survived when two doses of 0.1 mg. were given. 10 mg. per 20 g. body weight by mouth produced no toxic effects.—J. M. ROBSON.

I. SCHMIDT, W. (1937). Die Behandlung des Galtes mit Argento-Weidnerit. [**Treatment of Mastitis with Argento-Weidnerit**].—*Berl. tierärztl. Wschr.* Oct. 22nd. 655-657. [3 refs.]

II. HELM, R. (1937). Der gelbe Galt und Versuche zur Heilung mit Entozon-Infusionen. [**The Treatment of Bovine Mastitis with Entozon**].—*Z. InfektKr. Haustiere*. **51**. 268-286. 4 tables. [17 refs.]

I. S. records the treatment of 38 cows affected with streptococcal mastitis by injection of argento-weidnerit into the udder. In 29 quarters of 22 cows the treatment was successful, while in 26 quarters of 11 cows no success was obtained. The treatment appeared to be more beneficial when applied to cows in full milk than to those in the dry stage. The results were based on microscopic and bacteriological examinations.

II. H. applied treatment by entozon infusion to the infected quarters of 33 dry cows. Only two of these were free from streptococci at the next lactation.  
—S. J. EDWARDS.

PANASENKO, F. T. (1937). Lečenje strigušćego lišaja u teljat hlorm. [**Chlorine Gas Treatment of Ringworm in Calves**].—*Sovyet. Vet.* No. 10. pp. 7-9. 5 figs., 1 table.

When the lethal action of chlorine gas on surface cultures of *Trichophyton* after exposure for at least one minute had been verified, it was tested on ten calves affected with ringworm. The affected parts were moistened and the Cl applied direct from a Kipp's apparatus for periods of 1-10 minutes. Ten minutes' treatment was effective, but three minutes' exposure was not.

REGAN, W. M., & FREEBORN, S. B. (1936). **The Effect of Flies and Fly Sprays on Certain Physiological Processes of the Dairy Cow.**—*J. Dairy Sci.* 19. 11-28. 1 fig., 6 tables. [14 refs.]

The exposure of deep milking cows to large numbers of flies did not usually cause a serious fall in milk yield. *Stomoxys calcitrans* was the only species of fly which caused a significant fall, viz, 9.3%. The use of petroleum fly sprays greatly increased the fall in milk yield; this effect was greatest during hot weather, when a rise in body temperature as well as an increase in respirations occurred 24 hours after spraying. It was found that these sprays significantly reduced the amount of osmotic water (distinct from sweat) lost through the skin; this probably interfered with the thermo-regulatory apparatus of the cows.—A. T. PHILLIPSON.

HARWOOD, P. D., UNDERWOOD, P. C., & SCHAEFFER, J. M. (1938). **Treatment of Equine Strongylidosis with N-Butyl Chloride.**—*N. Amer. Vet.* 19. No. 7. 44-46. 1 table. [2 refs.]

Three horses were given doses of 0.1 c.c. per lb. body weight of N-butyl chloride in 8-10 times its volume in linseed oil, and P.M. examinations showed that the treatment was highly efficient.

Two horses each given 1 c.c. per lb. body weight died in a few days.

—W. J. IRONSIDE.

WRIGHT, W. II. (1937). **Critical Tests with Various Dyes as Anthelmintics for Chickens.**—*Rev. Med. trop. parasit., Habana.* 3. 125-132. 1 table. [4 refs.]

Several dyes were tested for their action upon a number of parasitic worms. Rose bengal 3-B, brilliant cresyl blue, dahlia, magdala red and auramine O had practically no anthelmintic action. Gentian violet given in small repeated doses was effective against *Strongyloides avium*. Azamine had some effect upon the *Raillietina* sp., as also had brilliant green, but the latter was found to be toxic. None of the drugs tried was of any value against *Capillaria annulata*, *C. retusa*, *Tetrameres americana*, *Cheilosporira hamulosa*, *Amoebotaenia sphenoides*, *Duvainea proglottina*, *Hymenolepis cantaniana*, or *Postharmostomum* sp.—W. J. IRONSIDE.

LÜHRS, E. (1938). Ueber die Einwirkung ultravioletter Strahlen auf Parasiteneier. [**Action of Ultra-Violet Rays on Eggs of Parasites**].—*Dtsch. tierärztl. Wschr.* 46. 985-986. 2 tables. [3 refs.]

Roundworms obtained from pigs at slaughter were kept at 37°C. for 48 hours, and the eggs produced during this period placed in shallow dishes. Some of these were exposed to ultra-violet rays from a quartz lamp for 5-60 minutes. Six days after the exposure no development was seen in eggs exposed for ten minutes or

longer, whereas the control dishes contained viable larvae. Similar results were obtained with liver fluke eggs. The amount of water in the dishes affected the results: eggs covered by 10 mm. water were afforded some protection, but even with a covering of 1 cm. of water protection was not complete.—J. A. NICHOLSON.

**TREMKÓ, F. (1937). Paresis puerperalis orvoslása. [Treatment of Milk Fever].—*Allatorv. Lapok.* 60. 175.**

T. reports success in the treatment of milk fever in 200 cows with caffeine and sodium salicylate given intravenously. [No reason is given for failure to use rational treatment].—Z. DE CSUKÁS (MAGYARÓVÁR).

**RUBAY, & BERTRAND. (1938). Contribution à l'étude des effets biologiques et du métabolisme du calcium. [Calcium Metabolism].—*Ann. Méd. vét.* 83. 97-112. 5 figs., 1 table. [8 refs.]**

The authors studied the effect of intravenous injections of calcium gluconate on cows in which the blood calcium was regarded as normal. They found that injection of 50-60 g. of calcium gluconate rapidly caused marked respiratory and cardiac distress, profuse salivation and watering of the eyes, and muscular tremors; they interpreted these effects as being due to excitation of parasympathetic nervous system. After injection, the calcium level of the blood rose, but tended to return rapidly to normal. They concluded that this was due to the rapid immobilization of the excess blood calcium by the cells of the soft tissues, only a small fraction being eliminated by the kidneys and intestinal tract.—N. J. SCORGIE.

**STEINMETZER, K., & GUDERA, R. (1938). Hexamethylentetramin bei Tieren mit alkalischen Harn. [The Use of Hexamethylentetramine in Animals with Alkaline Urine].—*Wien. tierärztl. Mschr.* 25. 44-48. [2 refs.]**

The presence of formaldehyde was tested in the urine by means of the very sensitive phloroglucin test. After the administration of hexamethylenetetramine to man and dogs, formaldehyde was present in the acid urine. No formaldehyde was present in the alkaline urine of the horse and the cow after the administration of the drug; after the administration of amphotropin, formaldehyde could be demonstrated in the alkaline urine of horses and cows.—J. M. ROBSON.

**DIETRICH, S., & OETTEL, H. (1937). Behandlung von Blutungskrankheiten mit Pektinen. [Treatment of Haemorrhagic Conditions with Pectins].—*Dtsch. med. Wschr.* 63. 1690-1694. 4 figs. [12 refs.]**

Clinical investigations showed that pectins shorten the coagulation time of blood, increase the number of thrombocytes, and shorten the bleeding time. It is suggested that a general and unspecific action on the blood is exerted, and the clinical use of pectins is discussed.—J. M. ROBSON.

**JAKUSEV, N. I. (1937). Vlijanie različnyh usloviĭ na barjernuju funkciju central'noj nervnoj sistemy lošadi pri encefalomyelitě. [Influence of Different Conditions on the Barrier Function of the Central Nervous System of the Horse in Encephalomyelitis].—*Sovyet. Vet.* Nos. 11-12. pp. 59-61.**

The protective power of the blood-brain barrier in the horse, rabbit and dog is discussed.

Experiments on healthy horses, dogs and rabbits showed that, under normal conditions, the blood-brain barrier prevented such substances as bacteriophage, antitoxin and sodium iodide, injected intravenously or intramuscularly, from penetrating into the cerebrospinal fluid. This barrier was broken in horses with

encephalomyelitis. Bleeding (1/5-1/6 of total blood), warming followed by cooling, intravenous injection of a hypertonic NaCl solution, urotropin, bile, dinitrophenol or chloral hydrate broke the blood-brain barrier for a shorter or longer time and allowed bacteriophage, antitoxin or NaI to pass through.

J. suggests that this effect might be used when close contact of the nervous cells with a therapeutic agent is required.

DEANESLEY, R., & PARKES, A. S. (1937). **Factors Influencing the Effectiveness of Administered Hormones.**—*Proc. roy. Soc. Ser. B.* **124.** 279-298. 4 text figs., 4 figs. on 4 plates, 5 tables. [Numerous refs.]

Experiments are described on the effect of subdivision of the total dose, nature of the solvent, addition of fatty acid to the solution, esterification of the hormone, volume of medium and route of administration. Certain of the free hormones showed greatly increased effectiveness when given in dry form by the subcutaneous implantation of tablets or crystals, and very prolonged effects were obtained in some cases. In general it seemed that the free hormones lost their inferiority to the esters if the method of administration made absorption inevitably slow, whereas the esters lost their superiority to the free hormones if absorption was rapid or instantaneous.—J. M. ROBSON.

ENGL, D. (1938). Put kojim idu capsulae i pilulae davane peroralno ov cama. **[The Course taken by Capsules and Pills after Peroral Administration to Sheep].**—*Vet. Arhiv.* **8.** 35-45. 2 figs., 2 tables. [20 refs.] [German summary].

In 84 sheep the course taken by capsules and pills after peroral administration was studied by means of röntgenograms. Capsules, whether administered alone or along with a fluid, usually entered the rumen; a few entered the reticulum also, but never the omasum or abomasum. Small pills, if given with large quantities of one of the following fluids—a weak solution of sodium sulphate, chloride or carbonate, or of saccharose solution, milk, water or defibrinated blood—usually went into the reticulum rather than into the rumen, but sometimes they went directly into the omasum or abomasum. Thirst did not seem to play any role. E. concludes that the course taken by capsules and pills administered perorally to sheep cannot be much influenced by the manner in which they are administered. [See also *V. B.* **6.** 371].—B. OSWALD (KRIŽEVCI).

GREENWOOD, D. A., HEWITT, E. A., & NELSON, V. E. (1938). **The Effects of the Fluorides and Chlorides of some of the Alkali Elements on Respiration and Blood-Pressure in the Dog.**—*J. Amer. vet. med. Ass.* **92.** 532-547. 6 figs., 6 tables. [3 refs.]

Significant changes in respiration were produced by smaller quantities of fluorides than of chlorides of the same radical. Initial small doses of fluorides (except KF) caused a decrease, and of chlorides (except  $\text{NH}_4\text{Cl}$ ), an increase in blood pressure, but larger doses of all the compounds studied produced a very low blood pressure. Fluorides in order of toxicity per kg. body weight are given as  $\text{NH}_4\text{F}$ , KF,  $\text{NaSiF}_6$ , and NaF, and similarly the chlorides as KCl,  $\text{NH}_4\text{Cl}$ , and NaCl, the cations being responsible to a large extent for the difference in toxicity of the various compounds of F and Cl.—ALFRED EDEN.

## POISONS AND POISONING

BOUCHET, G., & BOUCHET, A. (1938). Toxicité du nitrite de sodium. [**Toxicity of Sodium Nitrite**].—*Bull. Acad. vét. Fr.* 11. 433-435.

Three pigs receiving accidentally about 125 mg. per kg. body weight of  $\text{NaNO}_2$  instead of  $\text{KNO}_3$  in a mash, died within  $8\frac{1}{2}$  hours. P.M. examination revealed congestion of the serous membranes, marked congestion in the kidneys, a pinkish coloration of the muscles, and the blood black, thickened and uncoagulated. The same mash offered to six horses was refused by all except one, which showed no ill-effects.—ALFRED EDEN.

WILSON, H. F., & HOLMES, C. E. (1936). **Effect on Chickens of Arsenic in Grass-hopper Bait. Little Danger in Eating Arsenic-Fed Chickens.**—*J. econ. Ent.* 29. 1008-1014. 3 tables. [1 ref.]

The widespread use in Wisconsin of a poisonous grasshopper bait containing As led to an examination of its potential toxicity to poultry. Under cage conditions, fowls refused to consume the bait even when it was mixed with bran, and took slowly to bran to which As had been added, only a few deaths resulting. Analyses of the flesh and eggs of fowls fed on mash containing from 0.1 to 1% As showed that the As content was far too low to be dangerous to human beings consuming the flesh.—ALFRED EDEN.

TOWNSON, W. K., & GORDON, R. F. (1938). **Acute Arsenical Poisoning in Fowls.**—*Vet. Rec.* 50. 403-404. [3 refs.]

The authors describe the occurrence of mass poisoning in a flock of fowls, resulting in a heavy death rate. The outbreak was associated with the death of seven out of nine pigs, which showed intense gastritis and enteritis; the hens had been fed on the same meal as the pigs. Within a short time of feeding most of the hens became acutely ill. They showed swelling of the face, intense thirst, inappetence, cramps and partial paralysis. Out of a total of 150, 120 birds died.

P.M. examination revealed intense congestion of the skeletal muscles, and catarrhal inflammation of the proventriculus with sloughing of the mucous membrane, accompanied by a slimy exudate. The horny lining of the gizzard was separated from the muscular coat by a sero-fibrinous exudate, and the sub-epithelial layer showed diffuse haemorrhage and acute inflammation. Arsenic was found in the crop contents in the proportion of approximately one-tenth of a grain per oz. The source of the arsenic was not traced: there was a suspicion that it might have been given maliciously.—D. L. HUGHES.

## PHYSIOLOGY

BLOUNT, W. P. (1938). **Some Recent Advances in Veterinary Physiology and their Clinical Application.**—*Vet. Rec.* 50. 833-848. [Numerous refs.]

In a rapid review, B. discusses acetylcholine and other substances affecting the vegetative nervous system, the adrenal cortex, nicotinic acid, choline, the anti-diuretic fraction of the pituitary, testosterone, oestrin (in its carcinogenic aspect), the liver, rumination, and sweating. His statements are subsequently modified or enlarged in the general discussion.

"Mecholin", an acetylcholine derivative, is recommended for clinical use. Nicotinic acid will cure pellagra-like lesions in pigs and blacktongue in dogs. The liver has powerful regenerative powers, and is able to perform its functions if only one-tenth of it is active. B. considers that there may be a hepatic factor in milk

fever, but his evidence is not convincing. The discovery of uric acid in the blood is a delicate test for hepatic disorder, but only positive results are of significance.

—D. D. OGILVIE.

ZORN, W. (1986). Untersuchungen über einige wichtige Blutbestandteile beim Rind. [**Research on some Important Constituents of the Blood of Cattle**]. —*Festschrift J.U. Duerst*. pp. 415-427. 2 figs., 1 table. [In German]. Bern: Verbandsdruckerei.

The plasma proteins, albumin, globulin and fibrinogen and dried residue of blood showed considerable variation during the course of one day and over a period of four weeks. These variations did not seem to follow a regular course and did not occur simultaneously; thus feeding appeared to influence the total dry substance, but not the albumin, which appeared to be influenced by barometric pressure. At no time during the day was it possible to predict that these fractions would be present in the same proportions as they were on previous days. The albumin:globulin ratio was the most constant and showed only slight variations.

—A. T. PHILLIPSON.

FEDOTOV, A. I. (1987). Subokcipital'naja i cervikal'naja punkcii subarahnoidal'nogo prostranstva u krupnogo rogatogo skota. [**Spinal Puncture in Cattle**]. —*Sovyet. Vet.* No. 10. pp. 31-34.

The cerebrospinal fluid of cattle can be obtained by tapping the subdural space with a needle inserted between the occiput and the atlas, or between atlas and axis, the animal being in lateral recumbency. The needle should be 9 cm. long and 2 mm. in bore.

Observations were made on the cerebrospinal fluid of 22 cows, 4 oxen and 6 calves. The following data are quoted verbatim:—

"The cerebrospinal fluid of cattle is an odourless and transparent liquid. Its specific weight is 1.006-1.007; surface tension, approximately 0.967; pH, 7.4-7.6 (by the method of Michaelis); alkali reserve, 420-480 mg. (Nevodov, modified by Fedotov); protein, 0.115-0.2% (Roberts-Stolnikov); sugar, 54-60 mg. % (Gedorn-Jenssen); calcium, 52-61 mg. % (de Vaard), and NaCl, 620-760 mg. (Bangou).

Globulin tests by the methods of Nonne-Apelt, Pandy and Wierhold and the oxydation test of Benedek-Furso and Friedman were, as a rule, negative in all our experiments. Cytological tests, using Fuchs-Rosenthal's chamber, showed that the cerebrospinal fluid of cattle normally contains no more than 1-6 lymphocytes [? per field].

It is not advisable to withdraw more than 100 c.c. of fluid at a time, as this breaks the equilibrium pressure of the cerebrospinal fluid."

BILEK, F. (1986). Die Trächtigkeitsdauer beim Pferd und Esel. [**Length of Pregnancy in the Horse and Ass**]. —*Festschrift J.U. Duerst*. pp. 17-23. 8 tables. [8 refs.] [In German]. Bern: Verbandsdruckerei.

B. gives the conclusions drawn from statistical analysis of the data from many studs in Czechoslovakia. It was found that blood mares generally had shorter pregnancies than mares of coarser breeds; mares tended to carry their first foal for a shorter period than subsequent foals; those which foaled in summer had longer pregnancies than those foaling in winter; male foals, on an average, were carried three days longer than female foals by blood mares, but no difference was found in coarser breeds; old stallions sired many more male foals than did young stallions.—A. T. PHILLIPSON.

ROOS, J., & ROMJIN, C. (1988). Some Conditions of Foetal Respiration in the Cow. —*J. Physiol.* 92. 249-267. 6 figs., 8 tables. [13 refs.]

The oxygen capacity of blood from 11 non-pregnant cows lay between 10.28

and 18.45 volumes %. Foetal blood was obtained from the umbilical vessels, following caesarian section under local anaesthesia, on cows in the last two months of pregnancy. Foetal blood was found to have a greater oxygen capacity than maternal blood, but the reverse was found on blood taken from calves and their dams during the first few hours after parturition, although the oxygen capacity of both had increased. The percentage saturation of foetal blood (91% saturation with oxygen and 45% saturation with carbon dioxide at 8½ months) was higher than figures quoted for foetuses of the sheep and goat during the last weeks of pregnancy. The difference in partial pressure of oxygen and carbon dioxide between the foetal and maternal arterial blood was 64 mm. of oxygen and 9 mm. of carbon dioxide; maternal blood leaving the placenta had still a higher oxygen and lower carbon dioxide pressure than the arterial foetal blood. The dissociation curves for foetal and maternal blood showed that, while the carbon dioxide curves were very similar, foetal blood was capable of becoming more highly saturated with oxygen at lower pressures than was the maternal blood; thus at 26 mm. Hg of oxygen the foetal blood was 80% saturated, and maternal blood only 50%. The similarity of the carbon dioxide dissociation curves indicated that this was not due to differences in reaction of the blood.—A. T. PHILLIPSON.

ROEMMELE, O. (1988). Ein experimenteller Beitrag zur Frage der Fettresorption der Mesenteriallymphknoten des Schweines. [**Fat Resorption of the Mesenteric Lymph Nodes of Swine**].—*Z. Fleisch- u. Milchhyg.* **48**. 241-242. [1 ref.]

Fat is often found in the mesenteric lymph nodes of fattening pigs, especially between the ages of 9-12 months; the cut surface of the nodes has a characteristic appearance. In pigs fed on a diet supplemented by milk until slaughter, the mesenteric lymph nodes all showed marked fat resorption, while those of pigs fed on a diet of meal and water did not.—A. T. PHILLIPSON.

NESENI, R. (1988). Der Gehalt des Harnes unserer Haustiere an Vitamin C. [**Vitamin C Content of the Urine of Domestic Animals**].—*Prag. tierärztl. Arch.* **18**. 187-192. 4 tables, 3 graphs. [Numerous refs.]

The ascorbic acid content of urine taken from slaughter house animals was estimated by Tillman's modification of Strohecker and Vaubel's method. Values found for horses and cattle varied from 4-5 mg. per litre of urine. Green feeding appeared to increase the output of ascorbic acid in the urine, and female animals usually gave a higher value than males. Urine from calves and pigs contained 16-26 mg. per litre.—A. T. PHILLIPSON.

JACKSON, S. M., & GORTNER, R. A. (1988). A Study of the Proteins of the Inactive and Active Mammary Gland.—*J. biol. Chem.* **123**. 719-727. 1 fig., 1 table. [Numerous refs.]

The proteins of udders from heifers, dry cows with inactive glands, and cows recently dry, but with active glands, were analysed. The inactive glands yielded more albumin than globulin, whereas in the active glands the ratio was reversed. The changes in the proteins appear to be rather in their physical than in their amino-acid composition.—A. T. PHILLIPSON.

SEIFERLE, E. (1988). Ovarialstroma und Ovarialzyklus. [**The Ovarian Stroma and Ovarian Cycle**].—*Schweiz. Arch. Tierheilk.* **80**. 59-70. 8 figs. [18 refs.]

The ovarian stroma plays a direct part in the ovarian cycle by the role it takes in the formation, maturation and rupture of the follicle. Its indirect help consists

in the subsequent healing of the cavity and in the formation of the corpus luteum. The most active elements of the stroma are the spindle-shaped fibroblasts.

—A. T. PHILLIPSON.

JADASSOHN, UEHLINGER, & MARGOT. (1988). Sur l'allongement de la tétine du cobaye par l'effet des hormones. (Nipple-Test).—Dédutions pratiques. [The Guinea Pig Nipple Test for Hormones].—*Rev. Path. comp.* **38**. 570-579. 5 tables. [3 refs.]

Local application of solutions of equiline or oestrone (1γ per c.c.) produced an increase in the length of the nipple. Equiline was more effective than oestrone. Application of urine from pregnant women also produced lengthening of the nipple, and the results on oestrogen content obtained by this method agreed with those obtained by the Allen-Doisy test.—J. M. ROBSON.

DAU, W. (1987). Versuche über den Hormonnachweis zur Trächtigkeitsdiagnose der Stuten mit besonderer Berücksichtigung des Zellbildes des Vaginalsekretes der Mäuse und Ratten. [Hormonal Diagnosis of Pregnancy in Mares].—*Inaug. Diss., Berlin*. pp. 38. 4 figs. on 2 plates. [Numerous refs.]

The findings of FRITZ [*V. B.* **6**. 768.] were confirmed. A diagnosis could be obtained in 65-70 hours. Both treatment with ether and heating decreased the toxicity of the urine. The rat is a better test animal than the mouse. It is technically preferable to perform the test on serum rather than on urine.—J. M. R.

## TECHNIQUE AND APPARATUS

KERDEL, G. (1987). Farbmessungen am Blutserum gesunder Pferde mit dem Pulfrich-Photometer zur Ermittlung der normalen Schwankungsbreite. [Colour Tests on Equine Blood Serum].—*Inaug. Diss., Berlin*. pp. 19. 3 tables, 7 graphs. [15 refs.]

Under normal conditions the colour of the serum remained constant over long periods and showed little diurnal variation. Withdrawal of water caused a deepening of the colour in 8-12 hours; when water was given the serum became clearer in 3-4 hours. Foods with a high or low pigment content affected the colour of the serum in a few hours.—J. M. ROBSON.

GIBSON, R. B., & LOWE, R. C. (1988). Isolation of Bilirubin from Hog Bile. — *J. biol. Chem.* **123**. xli-xlii.

A brief description is given of two simple methods for the extraction of bilirubin from pig bile with chloroform. (1) The extract is dehydrated, filtered and the chloroform recovered by distillation. The residue is extracted with ether, leaving crystals of bilirubin. The yield is about 2 g. from 20-25 litres of pig bile. (2) Pig bile is saturated with chloroform and the crystals of bilirubin which separate out are washed and recrystallized. The yield is about one-sixth the bilirubin content.

—R. ALLCROFT.

VOSS, K. (1987). Farbreaktionen der Sexualhormone. [Colour Reactions] of Sex Hormones].—*Hoppe-Seyl. Z.* **250**. 218-220.

A new modification of the nitrosonaphthol reaction; this was specific for p-substituted aromatic oxy-compounds. Different colours were obtained with different compounds from which it could be determined whether the compound contained a single or a condensed aromatic ring system. The follicular hormone gives a positive reaction in a concentration of 1 : 10<sup>6</sup>.—J. M. ROBSON.

- I. PULLAR, E. M. (1936). **Curdled Blood. A Simply Prepared Fluid Medium for the Cultivation of Anaerobes.**—*J. Bact.* **32**. 181-188. [1 ref.]
- II. SPRAY, R. S. (1936). **Semisolid Media for Cultivation and Identification of the Sporulating Anaerobes.**—*Ibid.* 135-155. [14 refs.]

I. A mixture of one volume of defibrinated blood and four volumes of nutrient broth is steamed, reshaken, tubed and autoclaved. The medium favours slight sporulation and is blackened by proteolysis. The fine debris does not affect ordinary staining methods. The method gave good results with several species of *Clostridium*.

II. 328 strains of sporulating anaerobes were classified into 20 species by selected physiological tests applied chiefly in semisolid media, which permitted abundant growth under conditions eliminating the tedium of customary anaerobic technique. Formulae for these media, methods of performing tests, and interpretations of the reactions are outlined. Certain newly-observed tests are recorded for the recognition of several species. A tentative key to 20 common species is given, affording in a few cases only group identification, as for the butyric acid group.—R. O. MUIR.

- JOYNER, A. L., & JONES, C. P. (1937). **Individual Culture Dish with Increased Carbon Dioxide Tension.**—*J. Lab. clin. Med.* **22**. 1184-1185. [Copied verbatim from *Bull. Hyg., Lond.* **13**. 68. Signed G. S. WILSON].

A simple method is described for producing an atmosphere of 10 per cent. CO<sub>2</sub> inside a plate culture. The Spray anaerobic culture dish is used. Into one partition is introduced 1 c.c. of a molar solution of sodium bicarbonate (84 gm. to 1 litre of distilled water) sterilized by boiling or autoclaving, and into the other partition 1 c.c. of a 1/30 dilution of sulphuric acid. The inoculated Petri dish is inverted over the base and sealed with melted paraffin. The dish is then tilted and the two solutions are mixed. Since 22.4 c.c. of CO<sub>2</sub> are given off for each 1 c.c. of bicarbonate solution, and since the Spray dish has a cubic capacity of rather over 200 c.c., the resulting concentration of CO<sub>2</sub> is about 10 per cent. By this method excellent results have been obtained with plate cultures of the meningococcus and gonococcus.

- I. BARNARD, J. E., & WELCH, F. V. (1936). **Microscopy with Ultra-Violet Light. A Simplification of Method.**—*J. R. micr. Soc.* **56**. 365-371. 4 text figs., 6 figs. on 2 plates. [8 refs.] [See also *V. B.* **8**. 476].
- II. HAGEMANN, P. K. H. (1937). **Virus-Fluoreszenzmikroskopie. Eine neue Sichtbarmachung filtrierbarer Viruskörperchen. [Fluorescence Microscopy].**—*Münch. med. Wschr.* **84**. 761-765. 1 fig. [9 refs.]
- III. ALBIEN. (1937). **Fluoreszenzmikroskopie, eine neue und grosse Möglichkeiten schaffende Arbeitsmethode in der Virusforschung und Bakteriologie. [Fluorescence Microscopy in Bacteriology and Virus Research].**—*Tierärztl. Mitt.* **18**. 473-474.
- IV. ANON. (1937). **Fluorescence Microscopy.**—*Lancet.* **233**. 91-92. [1 ref.]
- V. HAGEMANN, P. K. H. (1937). **Fluoreszenzmikroskopische Untersuchungen über Virus- und andere Mikroben. [Fluorescence Microscopy Investigations on Micro-Organisms].**—*Zlb. Bakt. I. (Orig.)*. **140**. 184-198.

[The principle of this method of examining virus smears is that numerous substances glow brightly when exposed to ultra-violet light, the colour varying with the substance exposed].

I. The image is focussed in visible light from a mercury vapour lamp using a glass objective and a special double sub-stage condenser. The outer part of

this condenser is of glass for dark-ground illumination with visible light, and the central part is of quartz for ultra-violet light. When focussing is complete, by a special arrangement the glass objective is replaced by one of quartz without upsetting the adjustments, and the ultra-violet light is turned on. The fine adjustment is moved by a predetermined amount and the object is ready for photographing. The ultra-violet light is supplied by one of the new high-voltage discharge lamps instead of by a temperamental spark gap.

II. Smears of the virus-containing substance are immersed for a few seconds in primulin (a dyestuff). When illuminated with ultra-violet light under the microscope, the virus appears in the form of glowing particles against a dead black or faintly violet background. The examination must take place in a dark room.

H. was able to demonstrate the presence of mouse ectromelia virus, canary virus and pox virus, and virus-like structures in smears from Brown and Pearce rabbit tumour, foot and mouth disease, yellow fever and mosaic disease of tobacco plants.

The method is also applicable to bacteria and protozoa. It is only necessary that the bacterium or other body shall stain selectively with a fluorescing dye. Blood smears of sleeping-sickness can be rapidly examined because the glowing trypanosome is easily seen.

### III & IV. Annotations of II.

V. A lecture given by H. in which he discussed the history of fluorescent microscopy. The methods for staining bacteria and protozoa with fluorescent dyes were described. Sputum smears stained with Berberin sulphate and decolorized with acid alcohol were easier to examine, and revealed more tubercle bacilli using ultra-violet light, than similar smears stained with Ziehl-Nielsen and examined with visible light.—G. SLAVIN.

TEMPLE, P. L., & KON, S. Z. (1937). **A Simple Apparatus for Milking Small Laboratory Animals.** *Bio-chem. J.* **31**. 2197-2198. 1 fig. [1 ref.]

A brief description is given of a simple milking machine for milking small animals such as rats, rabbits, g. pigs and mice.—R. ALLCROFT.

APPENZELLER, W. (1938). Eine einfache Methode zur Besichtigung des Augenhintergrundes ohne Spiegel und ihre Brauchbarkeit beim Pferd, verglichen mit den üblichen Methoden. [**New Method of Examination of the Fundus of the Eye Without an Ophthalmoscope; Comparison with the Usual Methods. Comparative Examination of 200 Horses.**]—*Arch. wiss. prakt. Tierheilk.* **72**. 424-444. 8 figs. [Numerous refs.]

The usual methods of examining the fundus of the horse's eye with the ophthalmoscope and the principles underlying them are discussed. A simple method of direct examination is described in which the observer, bringing the rays of light from a pocket lamp into his axis of vision and advancing with it close to the patient's eye, can observe with ease a large field of the fundus, provided the eye is emmetropic and its media transparent.

All the methods were systematically employed on 200 horses and the results compared. In 86% the above direct method was sufficient. In 8.8% severe turbidity of the optic media impaired all methods of examination of the fundus. In 7% there was myopia, in 1.7% irregular astigmatism and in 2% various lesions which rendered the direct method of examination unsuitable.—G. WILLIAMSON.

KALWARYJSKI, M. B. E. (1938). Studia nad włośniami o metodzie impregnacji jodowo-srebrzej włośni miesniowych. [**Demonstration of Trichinella in**

**Muscle by Iodine-Silver Impregnation].—***Wojsk. Przegl. weteryn.* 9. 128-136. 4 figs. [4 refs.] [German summary].

K. describes his iodine impregnation method for the demonstration of trichinae in muscle sections [see (1928). *Zlb. Bakt. I. (Orig.)*. 108. 186].

Thin slices of infected muscle are placed in iodine-potassium iodide solution for ten minutes—different proportions being used for different sections (2 : 4 : 100, 0.5 : 1 : 100 or 0.1 : 0.2 : 100 in distilled water), washed in distilled water, decolorized in 2.5 % sodium thiosulphate until the muscle tissue is clear, washed in distilled water, placed in a solution of 10 % silver nitrate with strong ammonia (equal parts) until the iodine has disappeared from the trichinae, washed in distilled water, decolorized in 5 % sodium thiosulphate, washed in distilled water and mounted in glycerin under a cover-slip.

The iodine in the trichinae is converted into silver iodide, which stains the worms dark, the intensity depending on the strength of the I-KI solution used ; the colour is said to be stable, in contradistinction to the simple iodine impregnation method, in which the colour soon fades.

## MISCELLANEOUS

RICHARDSON, U. F. (1987). **The Influence of the Veterinary Profession on Empire Development.**—*J. comp. Path.* 50. 303-306. [1 ref.]

Attention is drawn to the influence of the veterinary profession in Empire development, emphasis being laid on the work of THEILER and PITCHFORD in South Africa, GRIFFITH EVANS in India, WATSON in Canada, Theobald SMITH in the United States of America and MCFADYEAN in Britain, by the study and teaching on the subject of contagious diseases amongst animals, *e.g.*, trypanosomiasis, piroplasmiasis, horse-sickness, and tick and virus diseases, and their control, prevention and eradication.

Such studies have led to successful emigration and production of healthy animals suitable for human food ; a good example being the control of tick fever in Argentina and the U.S.A. over large areas, and the control of rinderpest and pleuro-pneumonia in other countries. Thus, large tracts of land which hitherto were waste have become available and suitable for the raising of stocks. Doubtless as the value of veterinary work at home and abroad becomes appreciated at its true worth, the greater will be the fields of animal production and the greater the necessity for veterinary workers.—T. DUNLOP YOUNG.

JEANNIN, F. (1938). **Le vétérinaire colonial et ses spécialisations. [The Work of a Colonial Veterinarian].—***Rec. Méd. vét. exot.* 11. 36-40.

The colonial veterinarian has many important functions to perform that are quite different from those of his colleagues in France. His principal work, doubtless, is in connexion with the control and, where possible, the eradication of contagious diseases. In addition he must have a knowledge of the selection and cross-breeding of animals ; the breeding and feeding of them to suit the various requirements ; methods of transport ; the conditioning of skins and hides for conversion into leather, and much work in connexion with the milk industry.

The author speaks of the value of colonial veterinary services to the territories concerned, and of losses that have been suffered in the past owing to neglect to employ such services. He also speaks of game preservation.—T. DUNLOP YOUNG.

HUNTER, A. H. (1938). **Methods Employed for the Identification of Domesticated Animals.**—*Vet. Rec.* 50. 529-585. 6 figs. [16 refs.]

H. reviews the various methods of marking animals, such as by the registered brands used in countries where animals roam over large territories, and also marks on the ears and horns, and tar, raddle, and scissor marks. Ear marking is also used to indicate age in hill stocks. He refers to nasograms or nasal impressions, and photographs of both sides of particoloured animals.

It has been suggested that one horn should be left free from all identity markings except for indication of state of health, *e.g.* to show reactors to certain diseases. Tattooing seems to be the most satisfactory method of marking.—T. D. YOUNG.

GERMANY. (1938). Bestallungsordnung für Tierärzte. [**Registration Order for Veterinarians**].—Suppl. to *Reichsgesundheitsblatt*. 13. No. 13. pp. 12.

GERMANY. (1938). Bestallungsordnung für Tierärzte. [**Registration Order for Veterinarians**].—Suppl. to *Dtsch. Tierärztebl.* 5. No. 5. pp. 12.

WIENDIECK. (1938). Die Bestallungsordnung für Tierärzte vom 16.2.1938. RMBI G.205. [**Registration Order for Veterinarians**].—*Dtsch. Tierärztebl.* 5. 133-136.

Registration comes under the authority of the Reichsminister of the Interior. The regulations are set out in full, giving the personal qualifications for entry into the veterinary profession, the standard of previous education required for admission as a veterinary student, and details of the necessary courses of training, both theoretical and practical, and of the preliminary and final qualifying examinations. The courses and examinations may be taken in the Faculty of Veterinary Medicine of Berlin, Leipzig, Giessen or Munich universities or in the Veterinary College of Hanover, but the subjects for study and examination are laid down in strict detail. Periods of specialized practical training are compulsory, and after passing the final veterinary examination the candidate must do six months' practical work with a veterinarian, from whom a favourable report must be received by the Reichsminister of the Interior, before registration can be granted.—D. H. WILLSON.

DAUSCHER, G. (1938). Die Tierschutzsektion des Reichsvereines [der Tierärzte Österreichs]. [**Proposals of the Reich Society of Austrian Veterinarians for the Protection of Animals against Cruelty in Transport**].—*Wien. tierärztl. Mschr.* 25. 161-164 and 196-198.

Detailed recommendations are made concerning different kinds of transport, *i.e.*, by rail, road, sea and air.—D. H. WILLSON.

NORWAY. (1937). Rundskrivelse fra Landbruksdepartementet. Opheting (pasteuriserende) av melk m.v. til dyrefor. [**Circular from Ministry of Agriculture on Pasteurization of Milk, etc., Destined for Feeding of Animals**].—*Norsk VetTidsskr.* 49. 703-706.

This circular was published in accordance with earlier statutory rules and orders, by which all milk for animal feeding had to be pasteurized in certain counties and districts specially named by the Ministry of Agriculture. It indicates a number of such districts, and lays down that the milk must be heated to 85°C. (rapid method). Buttermilk must be produced from pasteurized cream. It is recommended that dairies should pasteurize milk for human consumption as far as possible. In this case, however, slow pasteurization may be employed. Rules for inspecting the milk used for animal feeding are given.—H. C. BENDIXEN.

MADAGASCAR. (1937). Règlement de police sanitaire des animaux à Madagascar et dépendances. [**Regulations with Regard to Animal Diseases**].—*Bull. Off. internat. Epiz.* 15. 629-636.

Certain contagious diseases of ruminants, pigs, equines and bees are listed as notifiable by the owner to the appropriate official. Details of procedure following notification are given, with special reference to rabies and anthrax. Regulations are laid down governing animal export and import to and from particular countries. All expenses are payable by owners of affected animals. There follows a list of penalties for infringement of the regulations.—R. O. MUIR.

LEBLANC, T. J. (1937). **What the Medical Student Should be Taught about Vital Statistics**.—*Amer. J. publ. Hlth.* 27. 1273-1276.

This short article is a plea for the teaching of elementary statistical methods to medical students.—F. W. PRIESTLEY.

LEITCH, R. H. (1937). **Mastitis Milk in Cheese-Making**.—*Agric. Progr.* 14. 40-43.

This article describes the characteristic defects of mastitis milk in cheese making, and includes an account of experiments carried out by L. Such milk usually gives weak rennet coagulation and a soft, unsatisfactory curd which often requires lengthy pressure to shape it; the lactic acid fermentation process may be delayed for several hours, even when the infected milk is heavily diluted with normal milk. The cured cheese is defective in body and texture, and often in flavour; it is usually of a low market standard.

#### OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1938). **Twenty-Seventh Report of the Development Commissioners being for the year ended the 31st March, 1937.** pp. 176. London: H.M. Stat. Off. [8vo] [2s. 6d.]

Of the sum placed at the disposal of the Commissioners in 1936-1937, £53,251 was expended on veterinary research institutions by annually recurring or special grants, and £45,670 on animal genetics, animal nutrition, dairy research, pig husbandry, poultry research and animal breeding. The veterinary institutes were:—The Institute of Animal Pathology, Cambridge University; the Research Institute of the Royal Veterinary College, London; the Foot-and-Mouth Disease Research Committee, and the Animal Diseases Research Association of Scotland. Short accounts of the administration and finance of the research institutes are given. In addition to the sums mentioned above, grants are made for advisory work, including veterinary science, at various colleges and universities.

For research and administrative expenses at the Field Station, established for the purpose of providing better facilities for the study of animal diseases and other subjects, the Agricultural Research Council received a grant of £61,000.

The following grants were made for new buildings at Institutes engaged in research or agricultural education:—University College of Wales, £15,000; Reid Library of the Rowett Institute, Aberdeen, £4,000; and the Animal Diseases Research Association of Scotland, £9,800.

The investigations in progress at the institutions supported by the grants of the Development Fund are described in reports issued by the Departments and reviewed in the reports of the Agricultural Research Council.

One studentship for research in animal health and one veterinary scholarship were awarded.—J. C. WALLACE.

GERMANY. (1938). Die Verbreitung von Tierseuchen und die Ergebnisse der Schlachtvieh- und Fleischschau im Jahre 1935 nebst vorläufigen Angaben über die Zahl der beschauten Schlachtungen in den Jahren 1936 und 1937. Bearbeitet im Statistischen Reichsamt unter Mitwirkung des Reichsgesundheitsamts. [**Germany: Animal Diseases and Abattoir Returns for 1935**]. pp. 124. Numerous tables, graphs, charts. Berlin: Paul Schmidt. [4to] [RM. 6.50].

The following notifiable diseases were present:—anthrax, bovine tuberculosis, swine erysipelas, glanders, fowl cholera, blackleg, foot and mouth disease, genital vesicular exanthema, sheep pox, swine fever and swine plague, rabies, fowl plague, equine mange and sheep scab. The other notifiable diseases (haemorrhagic septicaemia in cattle, dourine, rinderpest and contagious bovine pleuro-pneumonia) were absent.

As usual, the report gives details of diseases observed in the various government districts, and also meat inspection statistics. The original should be seen for details.—J. E.

ITALIAN SOMALILAND. (1938). Relazione sull'attività svolta nell'anno 1936-37. [**The Work of the Serum and Vaccine Institute, Italian Somaliland, for 1936-37**]. [RAVAGLIA, F.].—*Nuova Vet.* 16. 15-19 and 54-56. 4 tables.

The main work of the Institute was the production of RINDERPEST serum. Native breeds of cattle have been found to be better as serum producers than cattle imported from Kenya. The policy is to vaccinate as many cattle in the country as possible, and for this purpose four mobile units have been organized. The mortality rate of all vaccinated cattle did not exceed 0.5%.

HORSE-SICKNESS is very prevalent, especially among army horses. Carpano's method of vaccination has been adopted with apparently successful results, but it is too early to assess its true value.

Numerous deaths among camels have been investigated. Strongylosis and *Trypanosoma brucei* infection accounted for the majority.

Human SMALLPOX vaccine is prepared on a large scale at the Institute, which also undertakes pathological research and the study of zootechnical problems.

Trypanosomiasis caused heavy losses amongst cattle and no satisfactory method of control had been found. Bayer 205 and arsenic trichloride proved to be of no prophylactic or therapeutic value. A natural infection with *Tryp. brucei* and *Tryp. simiae* [V. B. 8. 633 and 634.] was shown to occur in pigs. These animals, however, were resistant to experimental infection with *Tryp. vivax*.

Fowl diseases were prevalent. The most important was a disease resembling fowl plague. Laryngotracheitis was also present in the territory.

Experiments in crossing Karakul rams with native sheep were highly successful. The resulting progeny show the characteristics of Karakul sheep and maintain their fertility.—J. A. NICHOLSON.

## BOOK REVIEWS.

D'HERELLE, F. (1938). Le phénomène de la guérison dans les maladies infectieuses. [**The Phenomenon of Cure of Infectious Diseases**]. pp. 414. 7 text figs., 12 figs. on 6 plates, 10 tables. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 75].

Although the title does not suggest it, this book concerns bacteriophage, and it is the third book by the author on the subject. The first part is couched in

general terms, on the nature of bacteriophage, and the second deals with its connexion with immunity in general and certain bacterial diseases in particular, three only of the latter being infections of domestic animals—haemorrhagic septicaemia, fowl typhoid and strangles.

The author asserts that bacteriophage plays an important part in epidemiology and that outbreaks are brought to a close largely by the formation of specific 'phage which kills off the causal organism. He claims to have observed this in H.S. and F.T.

He advocates the wide use of 'phage to control bacterial infections.—J. E.

**BRUMLEY, O. V.** [V.S. Dean of the College of Veterinary Medicine and Professor of Veterinary Medicine, The Ohio State University, Columbus, Ohio]. (1938). **Diseases of the Small Domestic Animals.** pp. 597. London: Baillière, Tindall & Cox. [3rd Edit.] [8vo] [25s.]

This book is sufficiently well known not to require much comment. The fact that it has reached its third edition is proof in itself that it fulfils a need. One unusual feature is that, contrary to the usual tendency in subsequent editions, the pages have been reduced from 611 to 597.

The author has dealt in perhaps too concise a way with all the important diseases (medical and surgical) of the dog, cat and rabbit, and each disease is treated from the point of view of aetiology, pathology, symptoms, diagnosis and treatment where these particular headings apply. Fowl diseases are not included.

Although the title might convey the impression of a text 'book with a "flavour" of pathology and bacteriology, these aspects are treated very cursorily; the book deals with clinical methods.

The subject matter has been brought up to date, and some subjects have been entirely rewritten. On the whole, however, there is comparatively little change, and the format remains the same.—GWILYM O. DAVIES.

**SOUTHWELL, T.** [D.Sc., Ph.D., A.R.C.Sc., F.Z.S., F.R.S.E., Walter Myers Lecturer in Parasitology, School of Tropical Medicine, University of Liverpool; formerly Director of Fisheries to the Governments of Bengal, and of Bihar and Orissa; Scientific Adviser and Inspector of Pearl Banks to the Ceylon Company of Pearl Fishers; Honorary Assistant, Zoological Survey of India; Internal Examiner in Parasitology at the University of Liverpool to the Royal College of Veterinary Surgeons], & **KIRSHNER, A.** [M.B., Ch.B. (Capetown), D.T.M. (Liverpool), F.Z.S. Formerly Assistant Lecturer in Parasitology, School of Tropical Medicine, University of Liverpool]. (1938). **A Guide to Veterinary Parasitology and Entomology for Veterinary Students and Practitioners.** pp. xvi+176. 123 figs., 12 diagrams. [4 refs.] London: H. K. Lewis & Co. Ltd. [2nd Edit.] [8vo] [10s.]

The second edition of this handy work contains all the descriptions of protozoa, cestodes, trematodes and nematodes parasitic in domestic animals, which made up the first edition [V. B. 8. 334]. In the present book there is the useful addition of a short section of some 80 pages dealing with arthropod parasites. Although we do not always agree with the authors' system of nomenclature, and in spite of the fact that certain of the statements made in the first edition have remained uncorrected in the second, it is felt that the book can be thoroughly commended as a guide, in virtue of its concise and clear descriptions, and its figures. Any alterations which we might be inclined to make are small and of minor importance in a work of this kind.—C. HORTON SMITH.

# IMPERIAL BUREAU OF ANIMAL HEALTH

## THE VETERINARY BULLETIN

---

---

Vol. 9.]

February, 1939.

[No. 2

---

---

### DISEASES CAUSED BY BACTERIA AND FUNGI

- I. CAVANAUGH, G. W. (1936). **Mastitis and Carbohydrate Deficiency.** - *Proc. 29th Conv. internat. Ass. Milk Dirs. 1936.* Prod. Sect. pp. 45-54.
- II. DAHLBERG, A. C., KUCERA, J. J., HENING, J. C., & HUCKER, G. J. (1936). **Composition of Milk as Affected by Sub-Clinical Mastitis.**— *Ibid.* pp. 54-67. 9 tables. [Also appeared in *Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 195-204].
- III. BURKEY, L. A., MEIGS, E. B., SANDERS, G. P., & CONE, J. F. (1936). **The Significance of Bacterial and Chemical Changes Occurring in Mastitis Milk.**— *Ibid.* pp. 67-70.
- IV. LITTLE, R. B. (1936). **Mastitis Detection and Control.**—*Ibid.* pp. 71-87. 1 table, 3 graphs. [12 refs.]
- V. HUCKER, G. J. (1936). **The Presence of Mastitis Streptococci in Bovine Mammary Tissue. (Preliminary Report).**—*Ibid.* pp. 87-92. 1 table. [6 refs.]
- VI. —. (1936). **Discussion of Mastitis.** [Speakers: ANDERSON, E. O., CASE, C. H., & UDALL, D. H.]—*Ibid.* pp. 92-98.

I. The author supports, and quotes at length, some observations reported by WIEDMANN [*V. B.* 4. 6.] that diet may have an influence on the growth of bacteria in the udder and the changes produced in the milk and, in particular, that a deficiency of carbohydrates may predispose to obvious symptoms.

II. The data on which this report is based have already been dealt with [*V. B.* 8. 195].

III. The authors believe that careless handling, rough milking practices, poor milkers and the abuse of milking machines are of considerable importance in the development of obvious mastitis. The use of milking machines at a high vacuum and the practice of leaving them on the cow longer than is reasonably necessary to obtain all the milk appears to increase the chloride content of the milk from cows showing no symptoms of mastitis. Cows which when carefully milked give normal milk show increasing symptoms of mastitis following the use of severe

machine-milking. On the other hand, mastitis-infected cows which have been milked by severe machine-milking are greatly improved after milking by hand.

IV. L. discusses the result of attempts to transmit mastitis, including those carried out by JONES and himself, and discusses the commonly accepted view that the organisms enter *via* the teat canal. He describes the production of typical chronic mastitis with a strain which was apparently *Str. agalactiae*, and of acute mastitis with a strain which corresponded to the Group II mastitis streptococci of British workers, small numbers of streptococci being introduced *via* the teat in each case by means of a small glass rod with a bead on the end. He regards the common chronic mastitis as being the more serious form in America and describes the well known symptoms that are recognized in Great Britain. In his opinion, laboratory examination is superior to any other single method for the control of mastitis, but he describes and discusses certain of the indirect methods which may be of assistance.

V. The data on which this report is based have already been dealt with [V. B. 8. 195].

VI. In this discussion, ANDERSON referred to the successful results of control based on the examination of milk samples at the Storrs Experimental Station. He also referred to the occurrence of mastitis due to coliform organisms in some of the cases. CASE reported that the administration of 500 c.c. of 12% lactose solution intravenously twice a week for two weeks was followed by decreased alkalinity and bacterial content of the milk, but that this change was of a temporary nature [number of animals not stated]. He also recorded an instance of a herd in which obvious symptoms of mastitis followed milking by a notoriously fast milker, and in which the symptoms disappeared when milking was more normal. He referred also to the importance of bruises or injuries. UDALL emphasized his view that expert clinical examination is as effective in detecting early cases as any other method.—A. W. STABLEFORTH.

PROUTY, C. C., & McCULLOCH, E. C. (1937). **Bacterial Development in Milk from Udder Quarters Infected with Mastitis and Its Effects on the Quality of Milk and Dairy Products Therefrom.**—*Rep. Wash. St. agric. Exp. Sta.*, 1937. p. 30.

Mastitis milk has a growth-retarding effect on numerous test organisms, especially *Streptococcus lactis*. This effect is marked in mixtures of normal and abnormal samples of milk up to a ratio of 1 : 4. This property is not affected by reducing the pH of mastitis milk to that of normal milk, but pasteurization is more effective in destroying this property if the pH is first adjusted.—H. E. BYWATER.

- I. BROWN, J. H. (1936). **Double-Zone Beta Haemolytic Streptococci.**—*Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm. 1922-1935*. pp. 298-246. 1 table.
- II. BROWN, J. H. (1937). **Appearance of Double-Zone Beta Haemolytic Streptococci in Blood Agar.**—*J. Bact.* 34. 35-48. 3 figs. on 3 plates. [18 refs.]
- III. BLISS, Eleanor A. (1937). **Studies upon Minute Hemolytic Streptococci. III. Serological Differentiation.**—*Ibid.* 33. 625-642. 7 tables. [11 refs.]
- IV. EVANS, Alice. (1937). **Studies on Haemolytic Streptococci. IV. Streptococcus Scarlatinae.**—*Ibid.* 34. 21-33. 2 tables. [18 refs.]

I. In this report, B. describes with numerous photographs the characters of certain streptococci which formed double-zones in poured blood agar plates which had been incubated and subsequently refrigerated. After 24 or 48 hours' incubation, the colony was surrounded by a clear beta zone, often with a hazy

margin. After some hours in the cold (or sometimes at room temperature) the colony became surrounded by a broad secondary band of haemolysis, separated from the first by a fairly distinct ring of corpuscles which were not haemolysed or altered in colour. The property of forming these double zones was stable, not having been lost by any of 150 strains, many under observation for a number of years. These strains came from both human and animal sources.

Descriptions of possibly similar strains by other workers are discussed. The appearance was most clearly shown in rabbit blood agar plates with 5-10% blood, and favoured by certain peptones and a slightly alkaline reaction. Observations are reported showing that the unhaemolysed corpuscles in the intermediate ring are not "fixed" in the manner characteristic of an alpha strain.

II. This is substantially the same as I, above.

III. B. studied by means of the precipitation and slide agglutination methods the group and type differentiation of 55 strains of the so-called "minute haemolytic streptococci", i.e., briefly, streptococci which produce a minute colony surrounded by a relatively very wide beta-haemolytic zone in poured blood-agar plates.

Fifty of these strains fell into one group, that to which LANCEFIELD has assigned the letter "F", and to which no "ordinary" beta haemolytic streptococci have yet been found to belong. Five strains belonged to LANCEFIELD's group G, which also contains other haemolytic streptococci [notably those from dogs].

The fifty group F strains could be divided into four types: type 1 contained 30 strains, type 2 thirteen strains, type 3 six strains and type 4 one strain. The five group G strains were all of one type and, curiously, the type antigen of these strains could not be distinguished from that of type 1 of the group F strains. Grouping of the "minute" haemolytic streptococci was found to be extremely difficult because of their extreme type specificity.

IV. E. examined the characters of 395 strains of haemolytic streptococci isolated from various human sources. In the second paper of this series dealing with *Str. pyogenes*, she stated that 61.6% of 120 scarlet fever strains had the characteristics of that species. Strains from a variety of other streptococcus infections were also classified as *Str. pyogenes*.

A group of 14 strains, all from scarlatina, is now described. They do not ferment salicin, and it is suggested that they should be given specific rank and called *Str. scarlatinae* (synonym *Str. anginosus*). The strains of this group all showed weak fibrinolytic properties. It is concluded that they may cause scarlet fever or sore throat without rash, but are rarely, if ever, the cause of other diseases.

—A. W. STABLEFORTH.

SHERMAN, J. M. (1937). *The Streptococci*.—*Bact. Rev.* **1**. 3-97. 5 tables. [Numerous refs.]

S. confines his review to the biochemical characters of the streptococci, with reference to their value for purposes of classification, and specifically excludes the technical importance of the streptococci as agents of disease and in industry, questions relative to nutrition, growth and general physiology (except where they contribute to a systematic synthesis), serological methods other than those which refer to broad groups, and variation. No attempt is made to discuss previous reviews. Methods are not discussed in detail.

Much of the material is put in tabular form, and the streptococci are first separated into a number of primary divisions based on:—haemolysis growth at 10°C. and 45°C.; growth in the presence of 0.5% NaCl, in a highly alkaline medium (pH 9.6) and in the presence of 0.1% methylene blue; reducing properties; survival at 60°C. for 30 minutes, and the production of ammonia from peptone. The

broad primary divisions thus made are as follows :— the pyogenic streptococci, the *viridans* streptococci, the lactic streptococci and the enterococci. Emphasis is particularly laid on the value of the temperature limits of growth.

Each of these broad primary divisions is then discussed in more detail. Within the pyogenic division are included :— *Str. pyogenes* (Lancefield's Group A); *Str. mastitidis* or *agalactiae* (Group B); *Str. equi*, the so-called animal *pyogenes* and the human "C" (all members of Group C); and streptococci belonging to Lancefield's Groups G, E and H. Due tribute is given to the work of Lancefield in regard to the broad group classification of haemolytic streptococci by serological methods. A table is given of the reactions of these organisms in the following tests :— fibrinolysis, hydrolysis of sodium hippurate, starch hydrolysis, aesculin splitting, growth on 40% bile-blood agar, curdling of milk, final pH in glucose broth, and the production of acid from arabinose, maltose, saccharose lactose, trehalose, raffinose, inulin, glycerol, mannitol, sorbitol and salicin. The value of these various differential tests is discussed and the usefulness of the fibrinolysin test, the sorbitol and trehalose tests, splitting of sodium hippurate and splitting of aesculin is emphasized, due regard being given to the fact that certain of these tests are only of value in the characterization of particular species or sub-divisions. It is suggested that it might be useful to make greater use of the temperature limits of growth, action on milk, fermentation of raffinose, methylene-blue tolerance test and hydrolysis of starch.

The *viridans* group, as defined by the author, is regarded as the least satisfactory of the primary divisions and only of temporary usefulness, because the known species or types probably represent only a fraction of the streptococci which fall into this group. [It might be remarked here that certain well defined streptococci associated with the more acute forms of bovine mastitis and which are definitely pyogenic are not referred to]. It is concluded that the further differentiation of this primary division must rest entirely on physiological characters for the present. In general, the streptococci in this group possess a high minimum and maximum temperature of growth, a weak reducing action, a limited tolerance to methylene blue, salt and alkali, and an inability to produce ammonia from peptone. Additional characters are given for the various members of this group, which includes *Str. salivarius*, *Str. equinus*, *Str. bovis* (several variants) and *Str. thermophilus*.

The *lactis* division is regarded as a homogenous and quite distinct group and includes *Str. lactis* and *Str. cremoris*. The streptococci of this division are distinguished from the pyogenic and *viridans* divisions by their ability to grow at 10°C., strong reducing action and tolerance to relatively concentrated solutions of methylene-blue in milk, and, on the other hand, from the enterococci by their inability to grow at 45°C. or in the presence of a high percentage of sodium chloride (6.5 per cent.), the inhibition of growth in an alkaline medium, and a somewhat lower thermal resistance. Additional characteristics of these organisms are given and it is concluded that there are many variants.

The *enterococcus* division is looked upon as containing faecal cocci occurring in diplococcus or short chain forms, somewhat resistant to heat, with an ability to ferment mannitol and a tolerance for bile. Other characters are tabulated and discussed and it is remarked that the properties of the members of this group, *viz.*, *Str. faecalis*, *Str. liquefaciens*, together with *Str. zymogenes* and *Str. durans* (both Lancefield's Group D) merge somewhat into one another and into those of other primary divisions of streptococci, and that two of the members, *viz.*, *Str. zymogenes* and *Str. durans*, are haemolytic, whilst certain organisms are proteolytic.

In conclusion, S. comments, amongst other things, that in an effort to find a few definitive tests for specific purposes, many of the older tests have been discarded,

although they are of great value for dealing with the problem of streptococcus classification as a whole, and that, whilst no one physiological test is infallible, the study of streptococci by means of a large series of reactions enables individual strains, even although atypical with respect to some character which is usually most constant, to be identified with considerable assurance. He has, with success, attempted to bring into relation some of the facts known regarding the various streptococci.

This sketch of Sherman's review can convey only an inadequate impression of the ground which he has covered or of the value of his contribution. The review itself will be read with profit by all who are interested in the streptococcus group, and will be particularly valuable to those whose interests lie mainly in one particular section.—A. W. STABLEFORTH.

DOLMAN, C. E., WILSON, R. J., & COCKROFT, W. H. (1936). **A New Method of Detecting Staphylococcus Enterotoxin.**—*Canad. publ. Hlth J.* 27. 489-493. [8 refs.]

The authors describe experiments carried out to determine the susceptibility of kittens to staphylococcus enterotoxin. They found that, except in one case, intraperitoneal injections of from 0.5-2.5 c.c. of filtrate set up a characteristic syndrome, with vomiting, diarrhoea and lassitude. In one fatal case in a kitten, no gross inflammatory changes were found in the gastro-intestinal tract; the authors conclude therefore that this enterotoxin can no longer be regarded as a direct gastro-intestinal irritant, and they suggest that further work is needed on the pharmacology of the condition.

The authors' view is that kittens are more suitable subjects for detection of this enterotoxin than monkeys, as the kitten's susceptibility is at once more marked and more regular. The article points out that heating and formaldehyde treatment which destroy staphylococcal exotoxins will frequently not affect the virulence of the endotoxins; it is therefore urged that no staphylococcus toxoid for human beings should be used unless 3 c.c., injected intraperitoneally into a normal kitten, produces no symptoms.

CHAPMAN, G. H., LIEB, C. W., & CURCIO, Lillian G. (1938). **The Use of Bromthymol Blue Agar and Phenol Red Mannitol Agar for the Isolation of Pathogenic Types of Staphylococci.**—*Amer. J. clin. Path.* 8. Suppl. to No. 1. 3-11. 3 tables. [8 refs.]

Phenol red-mannitol agar and bromthymol blue agar were used; after incubation for 18-48 hours, typical or suspicious staphylococcal colonies were isolated from both media and subjected to a series of six *in vitro* tests for pathogenicity:—pigment formation on proteose-lactose agar, haemolysis, coagulase formation and behaviour on crystal violet agar, bromthymol blue agar and Difco-phenol red-mannitol agar. Comparison of the results suggested that a combination of both media should be used to isolate the maximum number of pathogenic staphylococci.

—R. O. MUIR.

STERNE, M. (1937). **The Effects of Different Carbon Dioxide Concentrations on the Growth of Virulent Anthrax Strains. Pathogenicity and Immunity Tests on Guinea-Pigs and Sheep with Anthrax Variants derived from Virulent Strains.**—*Onderstepoort J. vet. Sci.* 9. 49-67. 10 tables. [7 refs.]

A number of virulent anthrax strains were grown on 50% serum-agar in different concentrations of CO<sub>2</sub>. Under these conditions all the strains grew smooth mucoid, and rapidly produced avirulent, rough, uncapsulated variants

which had the power of eliciting a very satisfactory immunity to anthrax in g. pigs and sheep. These strains could be obtained in a considerable range of CO<sub>2</sub> concentration, and the tests conducted on sheep indicated, as far as laboratory tests could, that vaccines prepared from avirulent strains are efficient and entirely safe.

No difficulty was met with in obtaining avirulent strains from any virulent culture, and the preliminary tests on g. pigs gave a good indication of the results to be expected in tests on sheep.

- I. DOLADILHE, M. (1936). Sur une propriété physique d'un des constituants de la fraction non dialysable d'un sérum sanguin. [**On a Physical Property of one of the Constituents of the Non-Dialysable Fraction of a Blood Serum**].—*C. R. Acad. Sci., Paris*. 203. 1295-1296. [8 refs.]
- II. PLACIDI, L., & MOREL, C. (1937). Sur une propriété particulière de la protéine visqueuse du sérum anticharbonneux. [**A Peculiarity of the Protein of Anthrax Antiserum**].—*C. R. Soc. Biol. Paris*. 125. 234-236. [4 refs.]

I. By adding distilled water saturated with CO<sub>2</sub> to normal serum, a flocculate is formed which can be recovered in solution by physiological saline. It is abundant, viscous, slightly coloured and is insoluble in water. This serum fraction has been shown to play an important part in precipitation tests.

II. The authors report a result similar to that recorded in I, and show that the precipitin of anti-anthrax serum is located in the viscous protein fraction. Details of the separation of this protein are given.—GWILYM O. DAVIES.

- I. SCHAEFER, W. (1938). Titration de l'antigène et de l'anticorps capsulaire de la bactérie charbonneuse selon la méthode de G. Ramon. [**Titration of the Capsular Antigens and Antibodies of *B. anthracis* by Ramon's Method**].—*C. R. Soc. Biol. Paris*. 127. 256-259. 4 tables.
- II. TAKAHASHI, Y. (1938). Dissociation de la bactérie charbonneuse à partir d'un germe unique. [**Dissociation of *B.a.* Starting from a Single Cell Culture**].—*Ibid.* 399-402. [1 ref.]

I. S. found that Ramon's flocculation test could be applied for the titration of capsular antigens and antibodies of *B.a.* Two methods may be used, the one with fixed quantities of antigen and variable quantities of antiserum, the other with constant doses of antiserum and variable quantities of antigen. S. compares the two methods, and points out that exact determination is more difficult with the first method.

II. By micromanipulation technique a series of anthrax cultures were obtained from a single smooth anthrax organism; T. showed that by using various methods dissociation of these cultures may be produced, either *in vitro* or *in vivo*. These changes are linked up with modifications of the organisms which particularly concern capsule formation and virulence.—GWILYM O. DAVIES.

CARMICHAEL, J. (1937). **A Brief Note on Tuberculosis in Tropical Africa with Special Reference to Uganda.**—*J. comp. Path.* 50. 383-385.

C. outlines the investigations carried out in 1937 on TB. in Uganda. These include:—(1) the incidence of TB. in cattle and other animals and typing of strains; (2) investigation into the susceptibility of the zebu type of cattle as compared with other breeds, and (3) the isolation and typing of strains of human origin.

The long-horned ankole cattle are severely affected, and double intradermal tests performed indicated that as many as 80% may be infected, while an incidence of over 40% is revealed by abattoir returns. Zebu cattle show little susceptibility, judging by the results of tuberculin tests.

Twelve cases in sheep were investigated, and of these 11 proved to be due to the bovine type of organism and one to the human type. Eleven cases in goats were found to be due to the bovine type. Pulmonary TB. is the usual form of the disease in human beings in Uganda. Of 250 specimens of human sputum received for examination, four yielded tubercle bacilli of bovine type.—S. J. GILBERT.

- I. WILKIE, J., EDWARDS, S. J., FOWLER, A. B., & WRIGHT, N. C. (1937). **The Relative Values of Raw and Pasteurized Milk in the Feeding of Calves.**—*J. Dairy Res.* 8. 311-323. 9 tables. [8 refs.]
- II. EDWARDS, S. J. (1937). **The Pathogenesis of Tuberculosis in Calves.**—*J. comp. Path.* 50. 377-382. 1 table. [7 refs.]
- III. RAUTMANN, H. (1938). Ueber die Ausbreitungswege der Tuberkulose bei Kälbern bis zu 14 Tagen. [**Pathogenesis of TB. in Calves up to 14 Days of Age**].—*Berl. tierärztl. Wschr.* May 19th. 279-282.
- IV. MACHENS, M. (1938). Die Auswirkungen der Anzeigepflicht der Kälbertuberkulose. [**Experience in Obligatory Notification of TB. in Calves**].—*Ibid.* 282-283.

I. A total of 73 calves completed a feeding trial extending over a period of 12 weeks. At the beginning of the experiment the animals, which were obtained from tuberculin tested Ayrshire herds, were 2-3 days old. During the first eight weeks the animals were fed exclusively on milk from a local depot, 86 calves receiving raw milk, and the remainder the same milk after commercial pasteurization. From the eighth to the 12th week a supplement of hay was provided in addition to the milk. The two groups were housed in isolated huts, but no attempt was made within each group to prevent contact between calves. Milk was heated to 100°F. and fed from teat buckets. At the end of the trial the animals were tested by the double intradermal test with synthetic tuberculin, and were then slaughtered.

Inoculation into g. pigs of 47 grouped samples of raw milk showed the presence of viable tubercle bacilli in 33. Of 45 samples of the same milk after pasteurization none showed infection.

Of the 86 calves fed raw milk, 24 reacted to tuberculin and 23 showed the presence of TB. at autopsy. In the group fed pasteurized milk, one animal reacted to the tuberculin test, but no lesions were found at autopsy, and g. pig inoculation failed to show the presence of tubercle bacilli.

Tuberculous calves showed lesions restricted to the pleural cavity—lungs and bronchial and mediastinal lymph nodes. No lesions were found in the mesenteric or pharyngeal lymph nodes. Although no precautions were taken to prevent respiratory infection within the group, this is unlikely to have been the route of infection in all the animals. The findings support the contentions of CALMETTE [*V.B.* 7. 359.] and his colleagues, *viz.*, that tubercle bacilli can penetrate the intestinal mucosa, reach the mesenteric lymph nodes and eventually produce pulmonary lesions without leaving any evidence at their portal of entry (occult infection). In man and bovines, ingestion is considered the most important route of infection. It is possible that the ingestion over a period of days of very small doses of tubercle bacilli may have been followed by absorption and passage through the mesenteric lymph nodes without sufficient stimulation to evoke a macroscopic lesion; a large single dose—as has usually been employed in experimental work—would probably have produced a visible primary lesion in the mesenteric lymph nodes. No significant difference was noted in the growth of the two groups of calves.

## II. A brief account of the matter in I.

III. By means of a questionnaire the distribution and character of the lesions in 174 cases of TB. in calves slaughtered within 14 days of birth was recorded in a number of abattoirs. In 35 animals isolated TB. of the liver and portal lymph nodes was detected; in all the remaining calves generalization had already occurred. The lungs were involved in 114 cases, by the ductus venosus, posterior vena cava, or from the mediastinal lymph nodes.

The port of infection was by the umbilical vein or by the amniotic fluid; in the latter case the primary lesions were found in the mesenteric lymph nodes. The former is the more common route of infection and the direct transference of the bacilli in the venous blood favours generalization.

IV. During the past five years, notification of cases of TB. in calves under three months old, found at meat inspection, has been made compulsory in Brunswick. In each case the cow must be traced and samples of sputum, uterine secretion and milk submitted to a laboratory for examination. Unfortunately complete sets of samples were not received from each animal, but the results indicate considerable success in picking out tuberculous cows.

Of 151 cows from which samples were examined, 87 were found to be tuberculous. Pulmonary TB. was found in 66 animals, udder TB. in 19, and uterine TB. in 51 animals.

The large number of cases of tuberculous metritis detected in this way is especially important. Constant changing of ownership often makes it extremely difficult to trace individual cows.

In 29 samples of sputum and uterine secretion in which no tubercle bacilli were found on direct microscopic examination, the use of antiformin was successful in revealing them without recourse to g. pig inoculation.—E. G. WHITE.

FELDMAN, W. H. (1938). **Generalised Tuberculosis of Swine due to Avian Tubercle Bacilli.**—*J. Amer. vet. med. Ass.* **92**. 681-685. 1 table. [6 refs.]

Avian type tubercle bacilli are responsible for most of the cases of localized TB. of swine in the United States, and it is generally believed that this type is a non-progressive disease of lymph nodes.

Material was obtained from an abattoir where most of the slaughtered swine came from districts in which TB. of fowls was prevalent. In a period of 11 months, 117,963 swine were slaughtered, and 18% proved tuberculous, 89 carcasses being condemned on account of generalized TB. The investigations were made from 28 carcasses showing generalization and from two others severely affected. Various organs were used and cultural tests and the inoculation of rabbits and g. pigs were performed in identifying the organism. Avian tubercle bacilli were found to be the sole aetiological agent in 24 out of the 26 cases in which tubercle bacilli were demonstrated; in two cases bovine tubercle bacilli were obtained, and results were negative in four others. F. concludes that, although avian TB. of swine is predominantly a localized disease of the lymph nodes, the lesions may become widely distributed and may involve such organs as the liver, spleen, lungs and kidney.—S. J. GILBERT.

- I. CORPER, H. J., COHN, M. L., SIMPSON, M. G., & BOWER, C. (1937). **The Effect of Radio Short-Waves on Tubercle Bacilli and Tuberculosis.**—*Amer. Rev. Tuberc.* **36**. 763-772. 3 figs. [16 refs.]
- II. CORPER, H. J., & COHN, M. L. (1938). **Some Fundamental Investigations on the Resistance of Tubercle Bacilli.**—*J. Bact.* **35**. 223-238. 2 figs., 6 tables. [9 refs.]
  - I. Radio short-wave therapy is thought to owe its effect mainly to the heat

generated, but it has been claimed that these waves have specific healing action on inflammatory and suppurative processes, apart from their heating action.

Experiments here described in detail showed that radio short-waves had no effect on cultures of tubercle bacilli *in vitro*, or on experimentally infected tuberculous g. pigs.

It is concluded that radio short-waves have no specific biologic effect on tubercle bacilli or on lesions caused by them.

II. A detailed description is given of the technique employed in experiments carried out to ascertain the thermolability of human strains of tubercle bacilli and their resistance to the action of acetic acid.

It was deduced that the type of media on which test-cultures are grown influences their resistance both to heat and to acetic acid. Cultures grown on egg medium containing broth showed higher resistance in this respect than did those grown on broth-free media or on glycerin-broth media. The age of cultures, within limits, had no influence on this resistance. Avian tubercle bacilli cultured under identical conditions with human tubercle bacilli showed relatively greater resistance to heat and to acetic acid.—H. BURROW.

SMITHBURN, K. C. (1938). **Effect of Age of the Host on Resistance to Tuberculous Infection.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 575-577. [2 refs.]

A series of experiments were made on g. pigs to ascertain whether or not age had any relation to resistance to TB. One bovine and two human strains of the organism were used. The g. pigs were inoculated intracerebrally, and the length of the period of survival was taken as an index of resistance. Young animals were more resistant than old, and resistance decreased progressively with age.—D. D. O.

WILLIS, H. S., & WOODRUFF, C. E. (1938). **Tuberculosis in Allergic and Desensitized Guinea Pigs.**—*Amer. J. Path.* **14**. 337-346. 12 figs. on 8 plates. [12 refs.]

The authors give details of experiments made to compare the effect of inoculation of virulent tubercle bacilli into g. pigs rendered allergic, and into corresponding groups which had been rendered allergic and then desensitized by repeated inoculation of tuberculin.

The desensitized group all died much earlier than did the allergic group. While the chief lesions in the allergic group were observed in the liver and spleen, those in the desensitized group consisted primarily of miliary tubercles in the lungs, and the liver and spleen remained free. It is deduced that the state of allergy has a restraining influence on the growth and dissemination of tubercle bacilli within the body.—H. BURROW.

- I. YANAGISAWA, K., & ANDO, K. (1937). **Studies on B.C.G. (Second Report).**—*Jap. J. exp. Med.* **15**. 295-302. 4 tables. [9 refs.] [In English]. [See also *V. B.* **6**. 396].
- II. SCHWARTZ, R. (1938). **Prémunition antituberculeuse du cobaye par instillations répétées de BCG sur la conjunctive. [Premunition against TB. by Repeated Instillation of BCG into the Conjunctiva].**—*C. R. Soc. Biol. Paris*. **127**. 205-207. [2 refs.]
- III. SCHWARTZ, R. (1938). **Prémunition antituberculeuse du cobaye par l'immunisation "concentrée" avec le BCG. ["Concentrated" Immunization with BCG].**—*Ibid.* 779-781. [1 ref.]
- IV. TUNARU, C. (1938). **Sur la persistance à l'état vivant des bacilles biliés Calmette-Guérin dans l'organisme du cobaye. [The Viability of BCG in the Guinea Pig].**—*Ibid.* 740-741.

- V. TUNARU, C. (1938). Caractères des bacilles Calmette-Guérin ayant séjourné des temps variables dans la cavité péritonéale des cobayes. [Effect on BCG of Maintenance in the Peritoneal Cavity of Guinea Pigs].—*Ibid.* 742-744. [1 ref.]

I. Three groups of 25 g. pigs each, shown to be negative to tuberculin, received 1.0 mg., 0.1 mg. and 0.01 mg. doses of BCG respectively at intervals spread over 2 weeks. A further group of 25 g. pigs did not receive these injections. The skin sensitivity was tested at the end of the first, eighth and twelfth months after the last injection. At the end of about a year all survivors in all groups received 0.01 mg. of a virulent human strain of tubercle bacilli subcutaneously.

The results of the skin sensitivity tests indicated that the g. pigs receiving the largest dose of BCG remained sensitive to tuberculin longest, and became sensitive to it more quickly than those which received the smaller doses.

The results of autopsies, made on all groups 20 weeks after the injection of the virulent human strain, showed that those receiving the largest dose of BCG offered the greatest resistance to infection. The results failed to show any correlation between sensitivity to tuberculin and resistance to infection as indicated by P.M. examinations; g. pigs sensitive to tuberculin were no more and no less resistant than insensitive g. pigs.

II. CALMETTE and GRYSEZ showed that it was possible to infect g. pigs with TB. by instillation of the virulent organism on to the eye. S. showed, in two series of experiments, that g. pigs which had received repeated instillations of BCG on to the conjunctiva were more resistant to infection by virulent strains of tubercle bacilli than were controls, when the test dose of these organisms was given by the conjunctiva or subcutaneously.

III. In each of two series of experiments, one group of g. pigs received repeated inoculations of BCG at the same site, another received repeated inoculations at different sites, and the third, a single large dose exceeding the total of the separate injections received by the members of the other two groups. The immunized g. pigs and a number of controls later received (subcut.) 0.001 mg. of a virulent culture of a human strain of tubercle bacilli. All the controls died or were killed.

This work indicated that a single large dose of BCG did not give so effective a resistance as small repeated doses and, similarly, though the difference was not so marked, that injections at several sites gave a better resistance than repeated injections into the same site.

IV. T. attempted to increase the virulence of BCG by repeated animal passage, but failed. Sterilized pieces of elder pith were kept in cultures of BCG for 24 hours in an ice-chest. These pieces of pith were then inserted into the peritoneal cavities of g. pigs. They were recovered at varying intervals of time and all were shown to contain the organism. T. does not believe that this was a simple persistence of the organism, but rather a multiplication when protected from the phagocytic mechanism in the presence of sufficient nutrient material.

V. The morphological characters and the staining reactions of bacilli recovered from the elder pith [see IV, above] are described.

In one series of experiments some strains isolated contained both rough and smooth colonies, while others contained smooth colonies only. In a second series, all the cultures obtained contained some rough colonies. G. pigs were inoculated with these cultures subcutaneously, and rabbits intravenously. Control g. pigs and rabbits were inoculated with BCG ordinary strain by similar routes, receiving similar doses of bacilli.

No differences were noted in the local lesions caused by the two types of

organisms in their ability to spread in the body. Sensitivity to tuberculin was similar in the control and in the experimental animals. T. concluded that the virulence of BCG was not increased when kept under the conditions of the experiment in the peritoneal cavity of g. pigs.—L. E. HUGHES.

VIANELLO, G. (1938). Un' enzoozia da mal rossino nei fagiani. [*Erysipelothrix rhusiopathiae* (**Bacillus of Swine Erysipelas**) Infection in Pheasants].—*Clin. vet., Milano*. 61. 234-243. 7 figs. on 2 plates, 2 tables. [11 refs.]

Eighty out of 200 pheasants 2-3 years old died with symptoms and P.M. lesions of septicaemia. An organism was isolated from the heart blood of some of the dead pheasants and was identified on cultural grounds as *E.r.*, details being given. The surviving pheasants were each given 0.5-2 c.c. of antiserum, after which no further losses occurred.

Pathogenicity tests were made with the isolated organism by injection (intravenous, subcutaneous or intramuscular) into 16 fowls and four pheasants; nearly all of them died after 4-30 days' illness. Cross-agglutination tests were made with the pheasant strain and with three porcine strains of *E.r.*, and all behaved alike. Finally, a note is given on the histopathology of *E.r.* infection in birds.

BAKER, J. A. (1938). **Tuberculosis of Fish.**—*Thesis, Ithaca*. pp. 93. 5 tables. [10 refs.] [Thesis not published. Abst. prepared from author's MS.]

B. describes an investigation to determine whether spontaneous TB. occurring in cold-blooded animals is due to acid-fast bacilli which ordinarily lead a saprophytic existence, or whether the causative agents possess parasitic specificity.

Cultures of acid-fast bacilli isolated from cold-blooded animals (*Mycobacterium thamnopheos*, *M. marium*, *M. cheloni*, *M. ranae*, and a platyfish strain) and from other sources (*M. butyricum*, *M. phlei*, *M. leprae* Brinkerhoff II, and an aquarium strain) were injected intraperitoneally into goldfish, with no apparent difference in pathogenicity. The rate of multiplication of the bacilli probably determined the lethal powers of the cultures, as fish kept at higher temperatures appeared to be less capable of resisting infection than those held at lower temperatures.

Infection by ingestion seemed much more accurate than the injection method in giving a true index of the pathogenicity of the organism studied. All the organisms proved lethal when injected, but differences in pathogenic powers were noted when the ingestion method was used. Feeding experiments of platyfish, with cultures of platyfish strain, aquarium strain, and *M. leprae* Brinkerhoff II as the inocula, showed that the platyfish strain was the only one of the group possessing definite invasive power. None of the cultures caused infection when fed to goldfish.

A spontaneous outbreak of TB. was observed in platyfish (*Platypoecilus maculatus*). Pure cultures apparently identical, were obtained from eight of 12 fish cultured. This organism, designated the platyfish strain, grew with difficulty on primary isolation, requiring media similar to those needed for cultivation of the mammalian and avian tubercle organisms.

It can be concluded from the study of the spontaneous outbreak of the disease due to the platyfish strain, its cultural characteristics, and the pathogenicity shown when fed to platyfish, that this strain does possess parasitic specificity not possessed by certain saprophytes tested in comparable experiments.—HERBERT L. GILMAN.

HAGAN, W. A. (1938). **Age as a Factor in Susceptibility to Johne's Disease.**—*Cornell Vet.* 28. 34-40. 2 tables. [1 ref.]

H. has maintained a dairy herd of cattle for 11 years under conditions conducive

to the spread of John's disease, which was also kept active by artificial infection of a large proportion of the herd.

Basing his conclusions on symptoms, P.M. lesions and periodical allergic tests by intravenous injection of avian tuberculin, he notes that calves protected from natural infection until they were four months old did not develop the disease; that many animals appeared able to overcome the disease without showing clinical symptoms; that among animals artificially infected an age resistance was evident, as none which were two years old before exposure became infected, and that the great majority (15 out of 16) of all fatally infected animals were born in the herd and, therefore, exposed to infection from the first day of life.—C. V. W.

JAUFFRET, R. (1936). La barbone au Cambodge. [**Barbone in Cambodia**].—*Bull. écon. Indochine*. 39. 725-743. 5 tables, 1 map.

Two important fatal diseases of cattle in Cambodia are rinderpest and pasteurellosis. Morbidity from pasteurellosis varies from province to province according to the density of the cattle population and the rainfall. The disease is most prevalent from May to September (rainy season). After serious epizootics, recovered animals remain relatively immune, and further epizootics are delayed until that acquired immunity has waned.

The virus of rinderpest paves the way for attack by pasteurella, and in these circumstances cases tend to be more severe. The paper quotes cases of simultaneous infection with rinderpest, pasteurellosis and anthrax.

Three forms of pasteurellosis are described. These are classified according to site and prognosis as follows:—(a) lymphatic form, (b) thoracic form, in both of which prognosis is grave, and (c) abdominal form, in which prognosis is favourable.

The lymphatic or oedematous form is usually peracute, death occurring in less than 24 hours from the onset of symptoms. The chief of these are:—sudden onset of illness, the animal standing immobile with straddled limbs; visible mucous membranes are cyanotic, respirations accelerated, muzzle dry, skin cold and coat staring, and a hot painful swelling appears in the pharyngeal region, increasing rapidly in dimensions and spreading to the neck and shoulder regions; difficult respiration increases, the animal falls, lies on its side moaning with limbs convulsed, and rapidly dies from asphyxia or syncope. This syndrome is especially frequent in young animals, which die in 6-10 hours, while adults survive this form of the disease for about 48 hours.

The thoracic form, of more rare occurrence, is characterized by general systemic disturbance (fever, cessation of rumination, etc.), coryza and laryngo-tracheitis, rapidly followed by clinical symptoms of pleuro-pneumonia. The accelerated breathing soon becomes noisy (roaring) and the animal usually succumbs in 5-8 days from the onset of symptoms.

The abdominal form of the disease, which is especially frequent in adult animals, is characterized at its onset by obstinate constipation and abdominal pain. The animal is excited, its nose is dry, and it exhibits dyspnoea and slight abdominal tympany. In 36 to 48 hours the intestinal symptoms suddenly develop into those of profuse diarrhoea, often tinged with blood and of offensive odour. This is followed by exudation from mucous membranes and profuse lachrymation. Since cases are usually first seen at this stage of lachrymation and sanious diarrhoea, differentiation from rinderpest is necessary. A detailed description of the skin lesions in rinderpest is given.

Pasteurellosis may be differentiated from malignant catarrh by the constant feature of keratitis which occurs in the latter. Differentiation between the lymphatic

form of pasteurellosis, blackleg and anthrax is discussed. Blackleg is stated to be very rare in Cambodia, while anthrax is differentiated by blood-examination.

Pasteurellosis in Cambodia has also to be differentiated from maize-poisoning. This condition is characterized by deep anorexia, anuria (or dysuria with blood-stained urine) and constipation.

Prophylactic measures against pasteurellosis, *viz*, removal of animals from infected ground and vaccination by the sero-vaccine method, are discussed; the latter method has reduced the mortality from 8.89% to 1.01%.—H. BURROW.

MLINAC, F. (1938). Prinos proučavanju infektivnog abortusa ovaca u Južnoj Srbiji uzrokovanog sojem srodnim sa *B. typhi* abdom. [**Infectious Abortion among Ewes in Southern Serbia, caused by a Micro-Organism closely related to *Salmonella typhi***].—*Vet. Arhiv.* 8. 362-372. 2 tables. [11 refs.] [English summary].

In January, 1938, a severe outbreak of abortion among ewes occurred in three districts of Southern Serbia. Autopsy of aborted fetuses revealed haemorrhagic infiltrations and petechiae of internal organs. A micro-organism showing morphological, cultural, serological and biochemical properties closely related to those of *S. typhi* was isolated in pure culture. Blood serum of the ewes that had aborted agglutinated up to a titre of 1 : 800, and the isolated cultures were agglutinated by stock human typhoid serum up to a titre of 1 : 1,600. Experimental abortion was induced in two ewes that were infected with the isolated culture, and the same strain was isolated from the aborted lamb.

Owing to the fact that the above outbreak occurred in districts in which typhoid fever in man was endemic, M. discusses the possibility of a causal connexion between human typhoid and abortion in ewes. Ewes are in all probability not susceptible to typhoid fever, but if they came in contact with typhoid bacilli their foetuses might be infected, with resultant abortion. Further investigations are to be made to ascertain to what extent ewes so affected might be carriers of typhoid fever.

—B. OSWALD (KRIŽEVCI).

GOJKOVIČ, D. (1937). Enzootički paratifni zarazni pobačaj kobila u seljačkim gospodarstvima. [**An Outbreak of Paratyphoid Abortion of Mares**].—*Jugoslav. vet. Glasn.* 17. 455-457. 2 tables. [Numerous refs.]

In 1935 and 1936 a severe outbreak of abortion affecting over 80% of the mares was recorded in the north-western regions of Yugoslavia. From two aborted fetuses a paratyphoid strain was isolated in pure culture. On account of its morphological, biological, cultural, serological and biochemical properties it was determined as *Salmonella abortus-equi*.—B. OSWALD (KRIŽEVCI).

WANNER, A. (1937). Beiträge zur Breslauinfektion der Enten. [***Salmonella enteritidis* Breslau Infection in Ducks**].—*Z. InfektKr. Haustiere.* 52. 128-162. 6 tables. [Numerous refs.]

The report of an investigation originating from a case of paratyphoid in a young man who had eaten a duck egg. The infection was found to be *S.e.* Breslau. The ducks from the farm which had provided the egg were obtained for investigation. They did not show signs of serious clinical illness, but half of them were in a depressed state of health. All the ducks were submitted to nine blood agglutination tests at intervals of 10-17 days, using both stock antigens and the strain which was isolated from the sick man. Half of the ducks had a titre of less than 1 : 5 and only a few had a titre above 1 : 20. Although several repeated blood culture tests were made, using Müller's enrichment method, the results were always

negative. Consequently it was considered that the infective organism only reached the blood in an acute stage of infection. Culture tests were also made with faeces at intervals of 2-9 days, and *S.e. Breslau* was isolated once on an ordinary culture medium and 18 times by the use of the enrichment medium. In most cases the organism was only isolated once from the individual ducks. 376 eggs were also examined, and *S.e. Breslau* was isolated from 19—seven times from the shell, 5 times from the white, and twice from the yolk. All the infected eggs came from ducks which had given negative results to all the above tests. The ducks were all killed and examined. In 80% there was a catarrhal enteritis, in 60% ovarian disease, and in 83% changes in the liver. Twenty-eight samples of material from each duck were examined culturally and *S.e. Breslau* was recovered from 19 samples from various ducks.

W. concludes that it is impossible to detect infected ducks by bacteriological tests on living birds, and that in suspected cases birds ought to be killed and diagnosis made from the carcasses.—SASSENHOFF (MUNICH).

ZDRODOVSKIĬ, P. F. [Editor]. (1937). Brucellez. Trudy Ekspedicii VIEM po Izučeniju Ovečjego Brucelleza (1933-1936). [*Investigations of the VIEM Expedition for the Study of Brucellosis of Sheep (1933-1936)*]. pp. 455. Numerous figs., tables, graphs. [Numerous refs.] Moscow: Viem Publ. Dept. [4to] [12s. 6d.]  
[VIEM are the initial letters of Vsesojuznogo Instituta Eksperimentalnoj Medicini, which means in English, Pan-Soviet Institute of Experimental Medicine].

This book is a collection of the reports by the various scientific members of the Commission which was delegated in 1933 by the A. M. Gorky All-Union Institute of Experimental Medicine in Moscow to study the problem of brucellosis in sheep. There were fourteen scientists on the staff of the expedition. The work was carried out from 1933 to 1936 on an extensive Experimental Sheep Farm in North Caucasus under the scientific leadership of Z., who in an introductory paper gives a general review of the results obtained by himself and his collaborators in the investigations of the different phases and aspects of the disease, with particular reference to the possibility of reconstituting healthy sheep flocks from diseased stocks with the help of allergic tests with the special antigen, "brucellysate", prepared by the Commission [see below].

ZDRODOVSKIĬ, P. (1937). Ekspedicija Vsesojuznovo Instituta Eksperimentalnoj Mediciny po izučeniju ovečjego brucelleza (1933-1936 gg.) [*Investigations on Brucellosis in Sheep from 1933 to 1936 in North Caucasus*].—*Brucellosis in Sheep*. pp. 9-18. Moscow: Viem Publ. Dept.

The flocks, chiefly of fine-fleeced varieties, covering a total of between 13,000 and 15,000 animals, were known to have been affected with the disease for several years. From the first observations the Commission realized that with the facilities available they could not undertake serological tests of all the animals on the farm. Preliminary experiments are said to have shown that allergic tests were reliable for the purpose of determining the presence or absence of brucella infection in the animals tested. It was soon found, however, that preparations used in western countries for these tests (*e.g.*, the English abortin and French brucellin and melitin, and the Italian anabortin) did not give entirely satisfactory results; this was chiefly because they did not always give specific reactions or because, owing to inadequate standardization, the reactions they caused were not strictly comparable; moreover, they had a sensitizing effect on healthy animals, precluding the possibility of subjecting the

same animal to a control test within a time limit useful for practical purposes. Such drawbacks are claimed to have been almost obviated with a soluble protein extract of *Brucella suis* [see p. 97.], which was prepared by the Commission, and which is referred to under the name "brucellysate".

In 1935, allergic tests with this preparation were made on all the sheep on the farms, and the results showed that 20-74% of the animals in the different flocks were affected with brucellosis; in similar tests, 19% of the human personnel (who numbered 600) were reactors, while among the hands directly in charge of the flocks infection ranged between 25 and 78%.

Cultures from 883 aborted foetuses yielded *Brucella melitensis* in 59% of the cases, indicating that well over one half of the abortions were due to brucellosis. The investigation is further claimed to have established that, while ewes are highly susceptible to infection, direct contact of the animal with sufficiently rich infective material is required to determine active infection. It is stated that abortion occurred only when the ewes were infected during pregnancy, and not if they were infected before service.

Allergic tests with "brucellysate" are finally claimed to have allowed of segregating from the flocks, in 1935, about 6,000 ewes giving negative reactions at two or three tests at intervals of one or two months. In 1,200 yearlings which were inseminated artificially in 1936, there were only three abortions; cultures from the aborted material remained sterile.

Collateral experiments are stated to have established for the first time that pigs may be infected with *Br.m.* and to have confirmed the high susceptibility of the Siberian marmot to brucellosis; they are further claimed to have brought fresh evidence of the possibility of lizards and sheep ticks [species not indicated] being infected with the organism.

ŠTRITER, V., VOSKRSENSKIY, B., & KOTLAROVA, H. (1937). K bakteriologii brucelleza u ovec pri estestvennoj infekcii i pri eksperimental'nom zarazhenii. [On the Bacteriology of Sheep Brucellosis under Natural and Experimental Conditions of Infection].—*Brucellosis in Sheep*. pp. 23-35. 1 fig., 7 tables. Moscow: Viem Publ. Dept.

The authors speak of the dearth in the literature of data on the distribution of the causal organism in sheep affected with brucellosis. They examined bacteriologically (a) the carcasses of 105 sheep artificially infected with a virulent culture of *Br. melitensis* (101 by subcutaneous injection, chiefly into a hind leg, four sheep infected *per os*), (b) 23 ewes slaughtered at various periods after natural abortion, and (c) the aborted foetuses of the ewes. In sheep injected with small numbers of the organism (5,000-100,000), and slaughtered 15-30 days later, *Br.m.* was only recoverable from the group of lymph nodes nearest the site of injection (regional infection), while in those that had received large doses (1,000,000 bacteria and over), it was also recovered from lymph nodes far removed from the site of injection, and also from certain internal organs. In cases of generalized experimental infection and in the naturally aborting ewes, *Br.m.* may be grown most frequently from the spleen, and from certain groups of lymph nodes, especially the pharyngeal mediastinal, portal, mesenteric and supramammary. In the sheep infected *per os* the infection was localized to the submaxillary and cervical lymph nodes. Only rarely was it obtained from the kidneys, blood, urine, or the mesenteric lymph nodes. The liver and the remaining lymph nodes occupy an intermediate position in this respect. In ewes naturally aborting as a result of brucella infection, the organism could usually be grown from the organs and lymph nodes enumerated above 15-30 days after abortion, but in about 50% of

cases the results were irregular 45 days to three months after abortion ; in no case could it be recovered after 4-13 months. Even at the earliest dates *Br.m.* is not always present in the blood of the aborting ewes.

The authors state that sowings should be made from as many organs as possible, as otherwise the results may be misleading ; in view of the relative paucity of the bacilli in the organs, fairly abundant material should be used.

TARASOV, I., & VERSILOVA, P. (1937). Opyt massovogo bakteriologičeskogo issledovania abortirovannyh plodov pri ovečjem brucelleze. [**A Bacteriological Examination of the Aborted Foetus for the Presence of *Brucella melitensis***].—*Brucellosis in Sheep*. pp. 37-44. 6 tables. Moscow: Viem Publ. Dept.

The authors give a detailed account of the technique they used for the bacteriological examination of 833 foetuses from 679 aborted ewes. Cultures of *Br.m.* were obtained from 50% of the foetuses. Growths were obtained from the amniotic fluid in 35% of cases, peritoneal liquid in 28.4%, urine in 28.5%, stomach contents in 23.2%, lungs in 22.9%, brain in 21%, heart blood in 19.7%, liver in 19.5%, spleen in 19.2%, kidneys in 18%, and ovary in 6.2%.

Out of 169 abortions of twin foetuses, *Br.m.* was obtained from only one of the twins in 37 cases (22%), demonstrating the necessity of making sowings from both aborted twins to avoid misleading results. The bacteriological examination of 93 lambs, which died 1-30 days after birth, showed that 24% were infected with *Br. melitensis*. Allergic tests with "brucellysate", carried out on 106 three-month-old lambs from affected mothers, were positive in nearly 10% of the cases, but were negative on 103 lambs of the same age, from unaffected ewes.

TARASOV, I. (1937). Materialy k klinike oveč'ego brucelleza. [**On the Clinical Picture of *Brucella* Infection in Sheep**].—*Brucellosis in Sheep*. pp. 107-115. 3 tables, 3 graphs. [3 refs.] Moscow: Viem Publ. Dept.

Artificial infection of 22 ewes with a virulent strain of *Br. melitensis* (via the skin or mucous membranes) was not usually followed by marked clinical symptoms or significant temperature reactions. Four ewes, however, which had been given large doses of the organism (from  $2 \times 10^{10}$  to  $4 \times 10^{10}$ ) *per os*, developed irregular fever, up to 41.4°C., during the first 45 days after infection, accompanied by general depression. Further observations on these ewes, and on 22 more which had aborted as a result of natural infection, showed that in all the animals abortion was preceded and followed by exactly the same symptoms and pathological conditions as described by DUBOIS in goats [(1912). *Rev. vét., Toulouse*. 19. 173]. It is pointed out that the osteoarthritic, synovial, and nervous troubles observed in the ewes are very reminiscent of the same complications in affected human beings. The intensity and duration of the different symptoms varied in the ewes, but of the 44 observed, 43 "recovered" within 4-6 weeks after abortion.

ANON. (1937). Proyecto y reglamento para la lucha contra la enfermedad de Bang. [**Project of a Law for the Control of Bovine Brucellosis**].—*Bol. mens. Direcc. Ganad. Montevideo*. 21. 274-283.

The subject is considered under several headings :— testing of imported stock ; certification of animals in shows, etc. showing that they are uninfected ; provision of government aid ; pasteurization or other treatment of milk from affected herds, and vaccination.

In "clean" herds, assistance will be given in cases of suspected reinfection, and in infected herds testing will be carried out and reactors eliminated or isolated.

Diagnostic tests will be carried out every five months until two successive tests prove negative, after which two further tests will be made at intervals of one year. Infected breeding animals will be isolated, and young stock will be weaned as soon as possible (4-6 months) and then isolated and tested when one year old and again five months later. On passing both tests they are transferred to clean herds. Other usual prophylactic measures will be adopted.

Out of 4,692 animals tested between 1932 and 1935 27% were reactors. Cases of human infection were also recorded.—A. H. HUNTER.

ROMAN, G. (1938). La vaccination effective du cobaye contre l'infection brucelique. (*Brucella melitensis*). Premiers résultats. [Vaccination of Guinea Pigs against *Br.m.*] pp. 68. 5 tables, 8 graphs. [19 refs.] Largentière (Ardèche): Imprimerie E. Mazel. [8vo].

R. describes the successful vaccination of g. pigs against *Br.m.* by the combined use of the glyco-lipid extract of Boivin and Mesrobianu (*V. B.* 6. 441.) and a living avirulent strain of *Br. abortus*. This strain of bovine origin, isolated in the Antilles, produces abundant  $H_2S$  and typical growth on Huddleson's dye media, but grows freely on Petragnani's medium. In large doses it causes transient formation of agglutinins in g. pigs, but after the third week it cannot be recovered in culture from the organs.

In the present experiments the g. pigs were divided into four groups; (1) received only the virulent test strain of *Br.m.*; (2) received glyco-lipid extract, and (3) received avirulent *Br. abortus*; groups (2) and (3) were subsequently inoculated with the virulent test strain. The fourth group received both the extract and the *abortus* strain, and were tested by infection with the virulent *melitensis* strain. This group was again divided into two sub-groups:—(a) eight g. pigs vaccinated three times at eight-day intervals with a mixture of extract and *abortus* suspension, each receiving a total amount of 1 c.c. of extract and  $15 \times 10^9$  organisms, and (b) 11 g. pigs receiving 0.5 c.c. of extract intradermally and 0.5 c.c. of *abortus* suspension intradermally plus 0.5 c.c. subcutaneously. The test inoculations were made after six and four weeks respectively. The test strain was applied to the freshly scarified skin in a dose of about two million organisms. Periodical blood cultures and agglutination and intradermal tests were performed; the g. pigs were killed after 5½ months, the organs and lymph nodes cultured, and any increase in their size was noted. Inoculation with glyco-lipid extract alone was followed by some immunization, but protection was not constant. The *abortus* strain also produced only a slight degree of immunity, whereas the use of both was followed by complete immunity in 80% of cases. Experiments are being continued with cattle and sheep.—S. J. GILBERT.

BULL, L. B., & TURNER, A. W. (1937). Investigations in Australia into some of the Problems of Infections by Anaerobic Micro-Organisms in Stock.—*J. comp. Path.* 50. 330-334. [Numerous refs.]

This is a résumé of the literature dealing with the following diseases:—“black disease”, enterotoxaemia of sheep, tetanus, blackleg, “big head” in rams, forage poisoning in horses and botulism in sheep.—P. S. WATTS.

ROBERTS, R. S. (1938). Braxy-Like Diseases of Sheep. I. The Mechanism of Enterotoxaemia with Particular Reference to *Cl. welchii* Type D.—*Vet. Rec.* 50. 591-604. 8 figs. on 2 plates, 10 tables, 4 graphs. [15 refs.]

R. describes a simple method by which sheep can be made to succumb to enterotoxaemia by ingestion of the causal organism.

The effect of secretions with which the organisms come in contact during passage through the alimentary tract was determined by a number of *in vitro* experiments. A sterilized cows' milk medium was used, and it was inoculated with a strain of *Cl.w.* Type D, obtained from a case of pulpy kidney disease. The first object was to determine the fate of the organism in the presence of free acid and milk. Incubation of organisms, acid, and milk together showed that viability was affected abruptly. Only 1% of organisms were viable at the free acid point. Viability appeared to be related to the amount of free acid present. The margin between acidity which did not kill the organism and that with near sterilizing effect was, however, very narrow. In milk with +50 units of free acid the effect on viability was exercised almost entirely within five minutes. The age of the culture was of no significance, nor did heat-resistant forms show special resistance.

The experiments suggested that the acid might be rendered innocuous by combination with casein. By adding casein in series to diluted milk, and incubating with acid and organisms, the effect on viability was found to be inversely proportional to the amount of casein present. The degree of acidity which inhibited proliferation was found by inoculating 10 c.c. of milk with 1 c.c. of 24-hour culture, in series. Slight retardation of growth occurred at -85 unit of free acid, and complete inhibition at -20 units.

The effects of pepsin, trypsin, and bile were investigated. Pepsin had no effect on the action of acid. Neither trypsin nor bile retarded the early growth of the organisms, and neither had any deleterious effect on toxin already formed.

By inoculating tubes of milk of pH 4.0 to pH 10.0 with 1 c.c. of 24-hour culture and incubating, it was found that a demonstrable amount of toxin was produced in  $3\frac{1}{2}$  hours within the limits pH 6.0 to pH 10.0.

A number of *in vivo* experiments were then undertaken. After a large milk feed, the abomasum contents of a lamb may remain at -100 units of acidity for three hours, but after a small feed acidity may rise to -35 units within two hours.

A lamb, hand-fed from birth, was given 600 c.c. of milk and the centrifuged bacterial growth from 120 c.c. of a 24-hour culture of *Cl.w.* Type D when seven days old. Samples were removed from the abomasum from time to time. The sample taken after three hours showed gas formation, and was toxic for mice. Characteristic symptoms appeared in the lamb in 3-4 hours, and death occurred in  $5\frac{1}{2}$  hours. A second lamb, two days older, died in  $5\frac{1}{4}$  hours.

Two one-week-old lambs given 100 c.c. milk, the centrifuged bacteria of 120 c.c. of broth culture, and sufficient magnesium carbonate to neutralize the acid which would saturate the casein, remained normal. A four-week-old lamb given 1,600 c.c. milk with the same dose of culture died after ten hours.

R's conclusion is that, after the ingestion of a large feed, the casein renders the acid of the abomasum inert for a sufficient time to allow *Cl.w.* Type D to proliferate in the abomasum and produce toxin. Progressively increasing numbers of organisms pass out, and the chyme becomes progressively more toxic. Production of the toxin occurs in the small intestine, where further proliferation and toxin production are possible. Absorption follows in the usual way.—D. D. OGILVIE.

PRIGGE, R. (1937). Experimentelle Untersuchungen ueber die serologischen Eigenschaften des Fraenkelschen Gasbazillus (*B. perfringens*). II. Mitteilung. [Experimental Observations on the Serological Properties of *Clostridium welchii*].—*Z. Immunforsch.* 91. 457-469. [11 refs.] [Copied verbatim from *Bull. Hyg., Lond.* 13. 238. Signed G. S. WILSON]. [See also *V. B.* 7. 415].

In a previous paper the author brought evidence to show that filtrates of *Cl. welchii* cultures contain an alpha or haemolytic toxin and a zeta or lethal toxin. Further work has confirmed these conclusions. Filtrates were prepared from cultures of different colonial types of two strains, A 52P and A 15P. The haemolytic titre of each filtrate was tested, together with the lethal dose ( $dl_{100}$ ) for mice inoculated intravenously. There appeared to be no constant relationship between these two titres. For example, in different filtrates the number of haemolytic doses corresponding to one lethal dose varied from 0.4 to 500. No relationship could be made out between the colonial form of an organism and the proportion of the two toxins to which it gave rise. Attempts were made to separate the toxins by precipitation with salts. The results obtained suggested that the zeta toxin could be thrown down to a considerable extent by saturation with sodium sulphate and the alpha toxin by subsequent saturation with ammonium sulphate.

OXER, D. T., ADEY, C. W., & KENNEDY, May. (1936). **Alum-Toxoid as a Vaccine for the Prevention of Tetanus in Animals.**—*Aust. vet. j.* **12**. 221-225. 1 table. [17 refs.]

The experimental work recorded was undertaken to determine the local reaction following vaccination with alum-toxoid, the immunity response and the resistance to infection following vaccination. In 30 horses inoculated, the local reaction consisted of a large oedematous area which disappeared in four days, leaving a small swelling which took weeks or months to resolve completely. Single doses of alum-toxoid injected into 20 horses stimulated a high antitoxic response. When five of these animals and five controls were later injected with toxin-free tetanus spores and calcium chloride solution the vaccinated horses were unaffected, while three of the five controls developed tetanus and were destroyed.—T. S. G.

DRIEUX, H., & BASILLE, D. (1938). Deux observations d'actinomycose de la peau et des muscles de la région dorso-lombaire chez la vache. [**Actinomycosis of the Skin and Muscles of the Dorso-Lumbar Region in Cattle**].—*Rec. Méd. vet.* **114**. 221-225. 1 fig.

Two unusual cases of *Actinomyces* infection of the skin of the dorso-lumbar region and underlying muscles are described, an interesting feature being that the distribution of the lesions was practically the same in both cases. The adjacent lymph nodes were not involved. Infection is attributed to the use of mustard as a counter-irritant, the mustard being contaminated with "spores". The diagnosis was made by microscopic examination of films and sections.

—GWILYM O. DAVIES.

BAREGGI, G. (1938). Contributo allo studio dell'actinomycosi. Un caso di actinomycosi primaria delle vie respiratorie. [**Primary Actinomycoses of the Respiratory Organs in a Pig**].—*Clin. vet., Milano*. **16**. 84-90. 6 figs. on 2 plates, 1 table. [Numerous refs.]

The following lesions were found in a young sow at Paira abattoir:—miliary nodules throughout the mucous membrane of the respiratory system from the larynx inwards, and in the lung substance; plaques on the epicardium and nodules in the myocardium; swollen, haemorrhagic bronchial and mediastinal lymph nodes; a plaque in the serous coat of the stomach; enlarged mesenteric lymph nodes, and ulcers in the intestine. The other organs were not affected. The nodules and plaques were grey, with necrotic centres, and on microscopic examination were found to be actinomycotic in origin. G. pig transmission tests were negative. The pathogenesis is discussed.

## DISEASES CAUSED BY PROTOZOAN PARASITES

MARKOV, A. A. (1937). Sovetskaja protozoologija v borjbe za ozdorovlenie socialističeskogo životnovodstva. [**Protozoan Diseases of Animals in U.S.S.R.**].—*Sovyet. Vet.* Nos. 11-12. pp. 37-41.

A short article in general terms on the protozoan diseases of livestock in Russia. Up to the present time 24 species of parasitic protozoa have been identified [not named by M.]. The chief control methods in use for piroplasmosis are dipping and pasture foliage clearance for tick destruction, and the destruction of rodent carriers of immature ticks.

Protozoicidal drugs have also been made and used to some extent—notably "naganin" [Soviet-made] against surra and, it is said, against dourine.

YUTUC, L. M. (1935). **Observations on the Occurrence of Surra in Laguna Province and Its Relation to the 1933 Outbreak among College of Agriculture Animals.**—*Philipp. Agric.* 24. 104-110. 2 tables. [10 refs.]

Surra has a wide-spread distribution in the Philippine archipelago, being found in nearly every province. Infection is found principally among water-buffaloes, and to a lesser extent among the native cattle. It occurs either sporadically or epizootically, the latter when a large number of animals are congregated, as for example with army horses. It is not known when the disease was introduced. The majority of the cases recorded at the College were among horses. In general, the nature of the disease among water-buffaloes and cattle is that of a chronic, relapsing type with a tendency to recovery.—J. A. GRIFFITHS.

PELLEGRINI, D. (1937). Tripanosi naturale del suino. [**Trypanosomiasis in Swine**].—*Nuova Vet.* 15. 905-908. [See also *V. B.* 8. 633].

P. records an outbreak of trypanosomiasis in a herd of Large White pigs imported into Italian Somaliland from Kenya. The symptoms were anorexia, staggering gait, marked anaemia and oscillating temperature. Blood examinations were constantly negative, except in one pig which was injected (subcut.) with 20 c.c. of sterilized milk to make the parasites come into the blood stream (said by P. to be a method used in diagnosing human malaria). In this animal trypanosomes appeared in the blood stream, and death occurred a few days later. Nothing noteworthy was seen P.M. Blood films stained with Giemsa revealed organisms morphologically similar to *Tryp. congolense* and *Tryp. simiae*. Attempts to infect young pigs with *Tryp. congolense* obtained from cattle yielded negative results.

—J. A. NICHOLSON.

I. CAILLEAU, R. (1938). Le cholestérol et l'acide ascorbique, facteurs de croissance pour le flagellé tétramité *Trichomonas foetus* Riedmüller. [**Cholesterol and Ascorbic Acid as Growth Factors for *Tr.f.***].—*C. R. Soc. Biol. Paris.* 127. 861-868. [4 refs.]

II. LWOFF, M. (1938). L'hématine et l'acide ascorbique facteurs de croissance pour le flagellé *Schizotrypanum cruzi*. [**Haematin and Ascorbic Acid, Growth Factors for *Trypanosoma cruzi***].—*C. R. Acad. Sci., Paris.* 206. 540-542.

I. C. details and tabulates culture tests of *Tr.f.* with broth media to which calf liver, g. pig liver, g. pig liver extracted with alcohol and acetone, cholesterol, living and killed *Bacterium shigae*, and ass's serum had been added singly and in various combinations as possible growth factors.

He concludes that cholesterol and ascorbic acid cannot be synthesized by *Tr.f.* and that they are necessary growth factors for this organism.

II. Hitherto whole blood in a concentration of about 20% has been added to most media for culture of *Tryp. cruzi* without the true growth factors being known. L. shows by culture tests of a basic peptone medium to which whole blood, serum, washed red blood cells, haematin and ascorbic acid were added in various combinations, that the serum, haematin and ascorbic acid were all necessary factors. The serum contains an unknown factor or factors designated TS, of which cholesterol may be a part, as has been proved in the case of the growth requirements of *Tr. columbae*.—C. V. WATKINS.

GIRARD, H., & FLUCHER, R. (1937). Un nouveau moyen de diagnostic de la leishmaniose et de la piroplasmose canines: la ponction du sternum. [Diagnosis of Leishmaniasis and Piroplasmosis in Dogs by Sternal Puncture]. —*Rev. Méd. vét., Toulouse*. 89. 617-640. 3 figs., 2 plates. [Numerous refs.]

The greater part of this paper is devoted to a study of the normal cells of the blood, their origin and development, and their appearances in preparations from bone-marrow withdrawn from the living animal. A technique for puncture of the sternum of the dog is described in detail, the puncture being made at the anterior sternebra with a trocar and canula. Material is withdrawn by means of a syringe, and spread carefully on slides. These films are rapidly air dried and stained by May-Grünwald and Giemsa. In describing the formation of the blood cells and the different types of cells encountered in their evolution, the terminology of Ferrata is closely followed. The role of the bone-marrow, spleen, lymph nodes, etc., in the formation of the blood cells and modifications which occur in these functions are discussed. A description of each type of cell is given, with appropriate comments in each case.

A table shows the percentage of the different types of cells encountered in bone-marrow smears made from the sternal medulla of healthy dogs of various ages. All were found except basophile myeloblasts. Leishmaniasis in the dog is a generalized condition, and sternal puncture affords a simple method of examination, as also in suspected canine piroplasmosis. The study of variations in the medullary cells in leucaemia and anaemias can also be easily performed by this method and should prove a valuable aid to diagnosis.—S. J. GILBERT.

LEGG, J. (1936). Anaplasmosis. Cross-Immunity Tests between *Anaplasma Centrale* (South Africa) and *Anaplasma Marginale* (Australia).—*Aust. vet. J.* 12. 280-288. 1 table. [3 refs.]

Since the discovery during the last few years that *A.m.* is widely distributed throughout the tick-infested areas of North Australia, the problem of finding a method of vaccinating against this organism is an important one. As the evidence regarding the value of protective inoculation with *A.c.* was conflicting, L. has conducted laboratory and field trials, using as infecting material the blood of carriers of *A.c.* obtained from South Africa. His results show that Australian cattle react fairly severely to inoculation with *A.c.*, but recover rapidly, and afterwards generally possess a high resistance to infection with *A.m.*

Cattle about to be transferred from clean to tick-infested country in Queensland are now premunized by inoculating them with *B.b.* and *A. centrale*. No untoward effects have followed the transfer of these cattle to tick-infested pastures.

The Australian cattle tick (*Boophilus australis*) transmits *B. bovis* and *B. argentina* as well as *A.c.* It has been found that *B. bovis* inoculation confers a high resistance to *B. argentina*.—T. S. GREGORY.

- I. MARČENKO, G. F. (1937). Kokcidiozy domašnih zivotnyh na severnom Kavkaze. [**Coccidiosis among Domestic Animals in North Caucasia**].—*Sborn. Rab. Leningrad. vet. Inst.* 1937. pp. 155-159. 1 table. [10 refs.] [German summary].
  - II. JAKIMOV, V. L. [YAKIMOFF, W. L.], & MAČULJSKII, S. N. (1937). Kokcidioz sobak v Leningrade. [**Canine Coccidiosis in Leningrad**].—*Ibid.* pp. 163-167. 5 tables. [17 refs.] [German summary].
- I. M. examined horses, cattle, sheep, pigs and rabbits in North Caucasia, and gives an account of the various coccidia he found in these animals.

Out of 165 horses examined, 24 were infested; the coccidia found are to be described in a later work. Out of 137 cattle examined, coccidia were found in 65, 54% of cases being due to *Eimeria smithi*, 20% to *E. zurni*, 16% to *E. ellipsoidalis*, one case to *E. bukidnonensis*, and the remaining 19.3% to mixed infection. All of the 60 sheep examined were infected with *E. arloigni*, *E. ninae* Koli-Jakimov, and *E. galousi*; *E. parva* was found in three sheep. Thirty of the 85 swine examined were found to be infected, 50% with *E. deblickei*, 20% with *E. spinosa*, 7% with *E. scabra*, and 23% with two or three of these species simultaneously. Among a "very great number" of the rabbits examined, infection with *E. stiedae*, *E. perforans*, *E. magna* and *E. exigua* was common; infection with *E. media* and *E. irresidua* was also suspected.

A table gives the number and size of the more important coccidia found.

II. Of 206 dogs examined for coccidia in Leningrad, 35 were found to be infected, those well cared for being the least affected. The following coccidia were found and are described:—*Isospora rivolta* in 29 dogs, *E. canis* in five and *E. cati* in one. The size and distribution of the coccidia and their relation to the age and sex of the dogs are shown in tabular form.

## DISEASES CAUSED BY VIRUSES

LIDLAW P. P. (1938). **Virus Diseases and Viruses**. pp. 52. London: Cambridge University Press. [8vo] [2s. 6d.]

In the Rede lecture for 1938 L. gave a wide review of the present knowledge on filtrable viruses of the animal and vegetable kingdoms, and discussed the theories on the nature of viruses—whether they are live micro-organisms or protein molecules. A table of virus particle sizes is included.—J. E.

- I. —. (1938). **Discussion on Recent Work on Heavy Proteins in Virus Infection and its Bearing on the Nature of Viruses**. [Speakers: HENDERSON SMITH, J., ANDREWES, C. H., BAWDEN, F. C., BERNAL, J. D., & MCFARLANE, A. S.]—*Proc. R. Soc. Med.* **31**. 199-210. [5 refs.]
- II. GORTNER, R. A. (1938). **Viruses—Living or Non-Living?**—*Science*. **87**. 529-530. [3 refs.]

I. HENDERSON SMITH, who opened the discussion, summarized the evidence favouring the view that the purified proteins, which have been isolated from infected plants, are the actual causal agents. The crystalline material obtained from the sap of diseased plants is infective in concentrations of the order of one hundred-millionth of a gramme per c.c., and is transmissible indefinitely in series. It has all the properties of the virus from the naturally infected plant with the sole exception of filtrability, which is lost as soon as the protein material is precipitated. This is attributed to an aggregation or polymerization of the particles.

ANDREWES discussed the possibility that some of the animal viruses might be of the nature of heavy proteins, and quoted experiments on the viruses of rabbit papilloma, equine encephalomyelitis, and vaccinia which seemed to support this view. He thought that the evidence in favour of the identity of the crystalline substance and a virus in the plant world was gradually increasing, but the problem as to whether they were micro-organisms or autocatalysts had not yet been solved.

"I shall not discuss whether these viruses are alive or dead, because I think it obvious that according to the criteria we have held in the past they possess some of the properties hitherto associated with autonomous living things and some hitherto associated with non-living chemical substances. But I should *not* conclude from that that they are in process of evolution from the non-living to the living. I find it far easier to think of them as small micro-organisms which in the course of evolution have gained by becoming smaller, losing some of the chemical complexities of larger beings, and perhaps thereby becoming subject to physico-chemical laws which may on occasion cause them to do such things as form paracrystals. I know that viruses are of a graded series of sizes, larger in some instances than cultivable organisms, that their immunological behaviour is like that of bacteria in that an animal once infected becomes more or less immune to subsequent infection, that some of them can form soluble haptenes, or multiply in an insect intermediate host, that they can mutate and adapt themselves to altered conditions. If I am asked to forget all that and adopt a new philosophy of life because the bodies in question can arrange themselves in orderly rows, I entirely refuse to do so."

BAWDEN said certain workers held that purified plant virus preparations consisted largely of inert proteins contaminated with small amounts of active virus, but he considered that this was improbable. The characteristic proteins had been found in enormous amounts in infected plants and never in those which were healthy, while the physico-chemical nature of the particular proteins isolated depended on the infecting virus and not on the host plant. These highly purified preparations were nucleoproteins and so acted as specific antigens giving visible precipitates with antiserum.

Five tobacco and cucumber viruses had been investigated. Each caused a characteristic disease, but all were serologically related, and their nucleoproteins possessed similar physico-chemical and serological properties. On the other hand, a highly purified nucleoprotein isolated from potato virus "X" differed from the preceding, since it did not give rise to paracrystalline needles, but to a flocculent amorphous precipitate.

He suggested that some of the smaller and more stable animal viruses had properties in common with these plant viruses. He pointed out that certain lines of treatment which denatured the protein caused a loss in infectivity of plant viruses without affecting the serological reactions. These results were of no practical value in plant viruses, but he thought they might be usefully applied to animal viruses for the preparation of vaccines.

BERNAL said that certain physical properties, coupled with X-ray examinations, had clarified the structure of the paracrystalline preparations, but gave no direct evidence as to whether the aggregates represented pure virus particles. He advanced the theory that the particles were really microtactoids. An X-ray examination showed that they were indistinguishable from "wet gel" containing about 50% of water, formed by drying the concentrated solution.

McFARLANE considered that the structure of these particles, as revealed by crystallographic measurements and other means, casts some doubt on the usual arguments for regarding the smaller viruses as living organisms.

II. G. reviews the modern attitude to the nature of viruses, maintaining that it has still to be proved that they are "non-living" particles. He points out, in regard to living cells, that even when the greater part of the cytoplasm has been dissected away from the nucleus, the latter is capable of regeneration. He suggests

that one might conceive viruses as living organisms, the cell nucleus of which has lost its capacity for cytoplasmic formation and has retained only the functions of elaborating nuclear material (chromatin), and of reproduction.

This concept would cover STANLEY's "nucleoproteins" obtained from plants. The crystalline nature of the latter does not rule out the possibility that they are living, since many unicellular organisms can arrange themselves in clusters: moreover, naked nuclei might form specific groupings, resembling crystals, under the influence of electrical phenomena.—R. E. GLOVER.

- I. LECLAINCHE, E. (1938). L'épizootie actuelle de fièvre aphteuse d'avril 1937 à mars 1938. [**Foot and Mouth Disease in Europe from April, 1937 to March, 1938**].—*Bull. Off. internat. Epiz.* 16. 17-46. 5 tables. 13 maps. Discussion pp. 307-370.
- II. FLÜCKIGER. (1938). Indications respectives de l'abatage et de l'immunisation dans la fièvre aphteuse. [**The Comparative Value of Slaughter and Immunization in F. & M. Disease**].—*Ibid.* 47-61. 1 map. [5 refs.] Discussion pp. 307-370.

I. L. analyses the circumstances which led to the change from a most favourable state in Europe at the commencement of 1937, when F. & M. disease was everywhere on the decline, to the serious position which arose during the succeeding 12 months. The text deals with the disease as it affected the continent of Europe, and does not refer to the incidence in the United Kingdom.

The origin of the recent epizootic appears to have been the importation in April of sheep and pigs from Morocco and Algeria, where several localized outbreaks had occurred. Commencing in the neighbourhood of Marseilles, the disease quickly extended through the centre of France and by the middle of August had affected practically the whole of the country. In spite of every precautionary measure which seemed feasible, it proved impossible to prevent extensions to Belgium, Germany, Holland and other countries.

The outbreak was due to an "O" type virus. It is thought that it originated in North Africa as a relatively benign strain, but was transformed in Europe into a highly active virus. Owing to the impossibility of obtaining sufficient amounts of hyperimmune serum, all affected countries resorted, in the first case, to haemotherapy. This method was not adequate in preventing the spread of the disease, but was of considerable value in protecting young animals from the severe type of infection.

II. F. explains that, when the outbreak extended through France, rigorous regulations were imposed along the Swiss frontiers. A few isolated outbreaks occurred, but they were arrested by the usual slaughter policy coupled with the use of immune serum. The only Canton in which the disease was extensive was that of Geneva, which is almost surrounded by French territory. Here, it proved necessary to abandon the slaughter policy, and as a result 22 separate outbreaks occurred.

F. lays special stress upon the danger of "carriers" as initiators of fresh outbreaks in countries where the slaughter policy is not adopted.

In the discussion which followed several speakers gave estimates of the enormous financial losses which had been sustained in Europe through the outbreak, the severity of which had necessitated the introduction of special measures in each country. BOES and WILLEMS said that in Belgium the ordinary methods of control proved totally inadequate, and that it was necessary to resort to the protection of cattle by the inoculation of formalized blood obtained from acutely infected animals. The results were partially favourable, although they were inconclusive.

FRENKEL explained that in Holland a culture virus had been tried with some success [see p. 84]. CABOT remarked that in Great Britain the present outbreak was of interest because it had provided significant information on the initiation and spread of the disease by migrating birds. VORACEK said that in Czechoslovakia ordinary methods of control broke down and serum inoculation was employed with varying success. In Poland, on the other hand, according to MARCZEWSKI, the disease did not gain such a strong hold, and in general the stamping out method had been fairly successful. Similarly, PETERSEN reported that in Denmark a threatening position had been cut short by the slaughter method. BISANTI, on behalf of Italy, claimed that thanks to rigorous police measures, his country had escaped a severe outbreak. The disease existed in certain localities where it was fought mainly by immune serum. MAGNUSSON explained that geographically Sweden was in a similar position to Great Britain. Since 1933 no case of F. & M. disease had occurred. At the present time powers had been obtained to indemnify owners for any animal slaughtered from F. & M. disease. He also cited the main provisions of a special treaty which had been effected with Denmark to ensure mutual cooperation in the control of the disease [*V. B.* 8. 699]. MÜSSEMEIER described the position in Germany where, prior to the current outbreak, the disease was almost under control. The present infection was so severe that, in addition to passive immunization, it became necessary to resort to active immunization by WALDMANN's method [*V. B.* 9. 17., and below]. Details were given of the manner of applying vaccine and the favourable results which had been obtained. [Since the publication of these articles, severe outbreaks of F. & M. disease have occurred in many of the countries which at that time were relatively free, e.g., Sweden, Denmark, Poland, etc.]-R. E. GLOVER.

- I. STROTHOFF. (1938). Die aktive Immunisierung des Rindes gegen Maul- und Klauenseuche mit Riemser MKS.-Vakzine nach Waldmann und Köbe in der Praxis. [**Active Immunization of Cattle against Foot and Mouth Disease by the Riems Vaccine of Waldmann and Köbe**].—*Berl. tierärztl. Wschr.* June 17th. 349-357. 4 tables, 9 charts. [1 ref.] [See also *V. B.* 9. 17].
- II. MAAS. (1938). Die aktive Immunisierung gegen Maul- und Klauenseuche mit Riemser MKS.-Vakzine nach Waldmann und Köbe. [**Active Immunization against F. & M. Disease with the Riems Vaccine of Waldmann and Köbe**].—*Berl. Münch. tierärztl. Wschr.* Aug. 12th. 477-487. 4 tables, 1 chart. [2 refs.]

I. The Riems vaccine was used on cattle in non-infected districts which lay on the path of an outbreak and on cattle in districts already infected in Silesia north of Breslau, in March, 1938.

The object of the first trial was to verify the harmlessness of the vaccine to healthy cattle and to study immunity conferred by it. 9,582 cattle in 33 villages were vaccinated, and in three villages F. & M. disease occurred in six animals within 14 days, the period required for the development of full immunity; infection was evidently brought in from an infected area. No outbreak occurred in herds of vaccinated cattle after the period of 14 days. The vaccine was tolerated very well by the animals and there were no complaints from the farmers.

In the second trial 31,094 cattle in 2,784 herds in one area were vaccinated, and observations were made on the course of the outbreak. Results are given in a number of diagrams, for the appreciation of which the original must be seen. In general it was found that if the herd became infected within the first 12 days after vaccination, about half the vaccinated cattle contracted the disease, but if

infection arrived later no case of F. & M. disease occurred. When the vaccination could be done five or more days before the arrival of infection the course of the disease in the cattle contracting it was very mild.

Full details of the vaccination campaign are given.

II. M. gives the results of the vaccination in April, 1938, of 15,170 cattle, 1,649 sheep and 322 goats in the Soldin district, where the disease had appeared four weeks previously. The vaccine was given to confined animals irrespective of their state of health, and in no case was any ill-effect noticed, nor could any case of accidental infection be referred to its use. F. & M. disease occurred within 12 days of vaccination on 22 out of 1,400 farms, but was considered to be due to natural infection and not to the vaccine. 244 out of 669 vaccinated cattle on the 22 farms contracted the disease. On eight farms on which the cattle had been immunized, sheep became affected, but none of the cattle. From experience in one small herd it appeared that the immunity conferred by vaccine was still present 13 weeks after vaccination.

Vaccination was successfully carried out on cattle at grass on four farms.

With regard to the general result of the vaccination, it was observed that the disease eventually broke out in only 30 farms in the district where it had been applied, whereas in two adjacent districts the number of infected farms rose to over 400 and 200 respectively.

M. considers that a wave of infection can be halted by the proper application of vaccine.—J. E.

- I. TOUSSIGN, E., FOGEDBY, E. F., FRENKEL, H. S., & VAN WAVEREN, G. (1938). Immunisation active des porcs et des bovins contre la fièvre aphteuse par le virus de culture adsorbé et à l'état pur. [**Active Immunization of Swine and Cattle against Foot and Mouth Disease with Adsorbed and Unadsorbed Culture Virus**].—*Bull. Off. internat. Epiz.* 16. 205-216. 4 tables. [8 refs.]
- II. FRENKEL, H. S., & VAN WAVEREN, G. M. (1938). Essais d'immunisation avec le virus aphteux cultivé sur des explantations de la peau embryonnaire bovine. [**Immunization against F. & M. Disease with Virus grown on Bovine Embryonic Skin**].—*Ibid.* 217-225. [1 ref.]
- III. LAVROVSKY, N. E. (1938). Essais d'immunisation active des bovidés contre la fièvre aphteuse par le vaccin chloroformé. [**Active Immunization of Bovines against F. & M. Disease with Chloroform Vaccine**].—*Ibid.* 226-243. 2 tables.

I. Vaccines were prepared from a type "A" virus cultivated on bovine embryonic tissue for 150 serial passages. They were either untreated culture virus or the same material adsorbed on aluminium hydroxide, and were injected by the subcutaneous route.

Unadsorbed virus sometimes induced clinical F. & M. disease, but the danger could be minimized by sterilizing the needle track in order to prevent infection of the skin. In the case of mixtures, preliminary tests in the g. pig showed that the supernatant fluid from the adsorbed virus was incapable of setting up infection. The vaccines were tested on pigs and cattle, two successive doses being given at six days' interval.

When the inoculum was mixed in a proportion of 2 c.c. of virus to 18 c.c. of  $Al(OH)_3$  it bestowed no appreciable protection on pigs vaccinated twice and subsequently exposed to natural infection, while when it was mixed in equal proportions, only two out of 15 treated animals resisted contact infection.

In the case of cattle more satisfactory results were obtained. Animals were vaccinated with pure virus, adsorbed virus or a combination of both, without visible effect beyond a rise in temperature: 14 protected animals were tested and 13 were immune to contact infection, although a proportion reacted when inoculated intralingually.

A highly virulent "O" strain behaved in a different manner, however, since adsorption to  $Al(OH)_3$  was incomplete and the inoculated cattle showed F. & M. lesions due to the vaccine itself.

II. A type "A" strain cultivated on embryonic bovine skin was used under field conditions. In one herd, culture virus was given intralingually together with a dose of hyperimmune serum. After 24 hours all the animals showed a primary vesicle and later mild lesions developed on the feet. There was no severe systemic disturbance and, provided the feet were treated early with 10% iodine, no secondary complications occurred. In a second group, which received virus only, the reactions were more severe.

III. The authors report the results of field trials with a chloroform vaccine prepared according to the method of Galéa [*V. B.* 3. 79]. A preliminary experiment showed that nine animals vaccinated twice intradermally with two doses were completely immune to contact infection, and six out of nine were also resistant to an intralingual injection.

In the field the results were less striking, the vaccine merely delaying the onset of lesions, while in calves practically no protection could be detected. Better results were obtained by a combined subcutaneous and intradermal method, although the resistance against natural infection was not always complete.

Further experiments were undertaken with a chloroform vaccine prepared locally with material from natural outbreaks. Complete immunity in all vaccinated animals was not attained, but the proportion affected, as compared with controls, was appreciably diminished.

It is stated that the antigenic value of the vaccine was increased by reducing the period of contact with chloroform from 10 to 7 days. The immunity commenced to decline at about the 43rd day.—R. E. GLOVER.

STAZZI, P. (1938). Dell'afta epizootica e della sua difesa. [**Control of Foot and Mouth Disease**].—*Clin. vet., Milano*. 61. 37-41.

The recent severe outbreak of F. & M. disease reached Europe from North Africa, and appeared in Italy as a panzootic where it was controlled by embargo on movement etc. and also by the use in certain cases of a polyvalent hyperimmune serum, which proved of some value. This was prepared by inoculating cattle recently recovered from an attack of F. & M. disease with the A and O types of virus passaged in g. pigs as these were the types that predominated in the outbreak.

Details are given of the doses used and comments are made on the duration of the immunity conferred.—J. A. NICHOLSON.

- I. DAUBNEY, R. (1937). **Rinderpest: A Résumé of a Recent Progress in East Africa.**—*J. comp. Path.* 50. 405-409. [9 refs.]
- II. BENNETT, S. C. J., & EVANS, J. T. R. (1938). **Influence of the Dose of Virus Employed in Testing the Immunity of Cattle Vaccinated against Cattle Plague.**—*Ibid.* 51. 1-8. 1 table. [3 refs.]
- III. D'COSTA, R. S. J. (1938). **Rinderpest—Methods of Immunisation.**—*Indian vet. J.* 14. 331-340.

- IV. JACOTOT, H. (1938). Sur l'emploi des pulpes organiques avirulentes dans la préparation des boeufs fournisseurs de sérum contre la peste bovine. [*Use of Avirulent Organ Pulp for Bulls Producing Rinderpest Serum*].—*Bull. Soc. Path. exot.* 31. 259-263. [3 refs.]

I. This paper summarizes briefly previous papers by D. on the use of vaccines in the control of rinderpest. In Kenya a comparison has been made of Indian goat virus, Kabete bovine virus and an attenuated goat virus produced at Kabete. Indian goat virus gave 85% reactors and 18% mortality in 100 cattle inoculated with this virus alone. Out of 100 cattle inoculated with 1 g. of tissue vaccine, and then 14 days later with 2 c.c. of a 2% suspension of goat virus (spleen tissue), 85 reacted. There were no deaths, and these animals resisted inoculation two months later with 2 c.c. of fully virulent 10% bovine spleen suspension, again with no deaths. Stock Kabete bovine strain virus gradually became attenuated from the 85th to the 150th passage through goats. The last symptom to disappear was diarrhoea. The possibility, therefore, of producing variants of rinderpest virus by serial passage in tissue culture seems highly probable. In two series of observations at Kabete the virus was carried through 3, 4 and 5 passages in bovine, caprine, and rabbit tissues. There appears to be some hope of producing in this way a cheap form of vaccine for the eradication of rinderpest. The virus of rinderpest does not appear to be pantropic and all attempts to produce a neurotropic variant have failed.

II. To prevent losses from rinderpest among cattle collected for seasonal use as serum producers, they are vaccinated with 1 g. per 100 kg. live weight of glycerinized vaccine (prepared from lymph nodes, spleen, thymus and tonsils). An experiment carried out to test the comparative effect of 1 c.c. of virus and 500 c.c. of virus given 3, 6, 9 and 12 months after vaccination showed no definite difference, all vaccinated animals being resistant. In the laboratory experiment 71.85% of the controls died of rinderpest. In a field test with 69 cattle intended for serum production, which had been vaccinated 20-27 weeks earlier, 60 gave normal reactions when given a hyperimmunizing dose of virus (1.5 c.c. per 1 lb. body weight). Eight animals became infected with rinderpest and of these three died; one animal gave an uncertain reaction. The authors in their summary state that "cattle plague serum producers may be hyperimmunized after simple vaccination".

III. This paper details the methods which have been used in India for immunizing animals against rinderpest. The author considers the serum-simultaneous method the most satisfactory means of dealing with the disease. It is of interest to note that goat virus alone is said to cause 70% mortality in "hill bulls" [see I, above]. According to the author goat virus can be used alone for immunization only on cattle which have a high degree of resistance to rinderpest; when highly susceptible cattle are immunized, anti-rinderpest serum must be used with goat virus. Unsatisfactory results are also attributed to the "goat virus" often being avirulent.

IV. As the result of a small number of experiments, J. concludes that it is possible to produce anti-rinderpest serum from cattle that have been immunized by the use of large doses of avirulent vaccine. Two animals received two doses of 50 c.c. of vaccine, and then one of 100 c.c., at intervals of 15 days, and one animal received two doses, each of 20 c.c., at 15 days' interval; serum from these animals prepared after 15 days and used for sero-infection of susceptible cattle protected them against rinderpest. There was only a thermal reaction with slight clinical symptoms; serum from the same source used after four months' storage protected calves in doses of 60 c.c.—J. A. GRIFFITHS.

ZENKNER, J., KOŁODZIEJSKA, Helena, & JASTRZEBSKI, D. (1938). Niedokrwistość zakaźna koni. [*Equine Infectious Anaemia*].—*Wojsk. Przegl. weteryn.* 9. 5-61. 6 figs., 1 chart. [Numerous refs.] [French summary].

Most of this article consists of a review of the literature. The authors give an account of an outbreak of E.I.A. among a large number of horses used in forestry work; 25 died of the acute form of the disease. Transmission experiments were carried out on four healthy horses. Two were injected subcutaneously with filtered infected blood, and both survived, one developing chronic E.I.A. and the other a latent infection. Another horse inoculated (subcut.) with unfiltered blood died of acute infection, and the fourth horse, inoculated (subcut.) with the mouth parts of 80 *Stomoxys calcitrans* which had been collected while feeding on a naturally affected horse, also died of acute infection within three weeks.

I. STECK, W. (1937). Studien über die infektiöse Anämie der Pferde. I. Statistik der Schadensfälle im Kanton Bern. [*Equine Infectious Anaemia. I. In Berne Canton*].—*Schweiz. Arch. Tierheilk.* 79. 368-383.

II. MRÓWKA, F. (1937). Ein weiterer Beitrag zur Pathogenese der infektiösen Anämie des Pferdes. V. Mitteilung. [*Pathogenesis of E.I.A. Part V*].—*Arch. wiss. prakt. Tierheilk.* 71. 364-382. 10 figs. [11 refs.] [See also, *V. B.* 6. 654].

I. A systematic report on E.I.A. between 1932 and 1936. 358 cases were diagnosed, of which 292 were sporadic. Diagnosis was based on clinical examination and little reliance could be placed on laboratory tests. Cases were more frequent in damp and badly drained areas than elsewhere.

II. M. carried out microscopic blood and tissue examinations on 12 cases of E.I.A. using special staining methods, chiefly scarlet red. Red corpuscles of horses with acute E.I.A. showed changes in shape; and triangular or quadrilateral crystal inclusions such as M. observed in cases of renguera in sheep in Peru. Sections of diaphragms stained by Gram's method also showed fatty infiltration with Gram-positive inclusions. The above were not observed in chronic cases. M. believes that the Gram-positive inclusion bodies are micro-organisms which can be present in healthy animals, but may on occasion multiply and cause a mechanical muscular disturbance. He considers that heart lesions found in acute cases of E.I.A. are an example of this. For details of the staining technique and the nature of the crystal and fatty bodies described, the original should be consulted.

—F. FREUDENBERG (HAMBURG).

ALEXANDER, R. A. (1936). *The Horsesickness Problem in South Africa*.—*J. S. Afr. vet. med. Ass.* 7. 211-220. [19 refs.]

This article is a review of the work carried out on immunization methods against horse-sickness. The question of the insect vector and the possible reservoir of the disease has not yet been determined. The first method of producing an active immunity was the use of serum-virus. It was too cumbersome in practice, too expensive, and did not give an adequate immunity against the multiplicity of strains in the field. The formalized virus method subsequently tried was a failure in practice. The present method, using neurotropic virus attenuated by passage through the mouse brain, has given excellent results in the field. It was possible to include a variety of strains in the vaccine, a durable immunity is produced, there is no mortality, and there are no unpleasant sequelae as a result of the inoculation itself.—E. M. ROBINSON.

RUBINO, M. C., & ESPANTOSO, K. (1987). Informe sobre una enfermedad de los lanares. El "Ectima contagioso". [**Contagious Ecthyma in Sheep**].—*Bol. mens. Direcc. Ganad. Montevideo*. **21**. 978-987. 5 figs.

In the outbreak reported, lambs were chiefly affected, but older sheep were not immune. Foot and mouth disease had run through the flock about two months previously. The disease was set up in experimental animals with filtered material. Prickly plants seem to have played an important part in preparing the path for infection.—A. H. HUNTER.

NEITZ, W. O. (1987). **The Transmission of Heartwater to and from Blesbuck (*Damaliscus albibrons*) by means of the Bont-Tick (*Amblyomma hebraeum*).**—*Onderstepoort J. vet. Sci.* **9**. 87-46. 3 figs., 4 tables. [4 refs.]

Experiments are described in which it was possible to transmit heartwater to two blesbuck by infesting them with *A.h.* ticks known to be infected. Clean larvae and nymphs were able to acquire infection when feeding on one of the blesbuck. By subinoculating blood from the blesbuck into susceptible sheep, the heartwater "virus" could be demonstrated for a period of 85 days in one and for nine days in the other blesbuck. These experiments tend to show that under natural conditions heartwater can be maintained in ticks in the absence of domestic ruminants.

JACOTOT, H., & LE ROUX, G. (1988). Transmission de la rage au paon (*Pavo muticus L.*). [**Transmission of Rabies to the Peacock**].—*C. R. Soc. Biol. Paris*. **127**. 18-19. [1 ref.]

Intracerebral inoculation of three peacocks with strains of rabies street virus caused paralysis, with or without preliminary excitement, after an incubation period longer than that in rabbits and g. pigs.—R. O. MUIR.

WEBSTER, L. T. (1938). **Experiments on Antirabic Vaccination with Tissue Culture Virus.**—*Amér. J. Publ. Hlth.* **28**. 44-46.

The evidence that dogs can be immunized successfully with a single dose of culture virus is set out in as much detail as the present state of the work allows. Experiments have shown that, so far, no commercial vaccine can set up immunity, and an attempt is being made to prepare a vaccine which is effective and also free from brain-tissue.

"The technic of propagation is carried out in the following manner. Using aseptic technic throughout, 50 c.c. Erlenmeyer flasks are prepared with 4 c.c. of Tyrode solution containing 10 per cent. normal monkey serum plus 0.02 c.c. of a suspension of minced mouse embryo brain. This flask culture medium is then inoculated with 1 c.c. of a 1 to 100 dilution of the brain of a mouse prostrate on the 7th or 8th day following an intracerebral injection of rabies virus. At 3 to 4 day intervals, the contents of the flask is withdrawn to a centrifuge tube, allowed to settle, and 2.5 c.c. of the relatively clear supernatant is transferred to a second culture flask. This passage technic is repeated routinely and the virulence of the culture virus is titrated by inoculating the material intracerebrally in tenfold dilutions in Swiss mice."—D. D. OGILVIE.

PINDER, G. D. (1988). **Canine Distemper.**—*Canad. J. comp. Med.* **2**. 13-17.

P. discusses distemper from a clinician's point of view. He stresses some predisposing causes, such as anaphylaxis, parasites and malnutrition, and outlines therapeutic measures.—CHAS. A. MITCHELL.

BROADHURST, Jean, MACLEAN, M. E., SAURINO, V., & SLAWSON, A. (1988). **Nasal Inclusion Bodies in Dog Distemper.**—*Cornell Vet.* **28**. 9-14. 10 figs. on 1 plate. [13 refs.]

The authors describe the presence of inclusion bodies comparable to the Negri bodies of rabies in the cells of the nasal mucosa of dogs with distemper. They were not detected with ordinary stains, but were readily demonstrated by treating heat-fixed preparations with a watery solution of nigrosin for 15-20 minutes. They ranged from  $0.5\mu$  to  $2\mu$  in diameter, and were usually situated in the cytoplasm.

These bodies were abundant in the acute stages of distemper, but became infrequent during the period of convalescence: nevertheless, they were still detectable in certain instances for several months after recovery. The significance of these bodies in the diagnosis of dog distemper is discussed.—R. E. GLOVER.

PENTIMALLI, F. (1936). Nature chimique de l'agent du sarcome du poulet. [**Chemical Nature of Fowl Sarcoma Virus**].—*Acta Intern. Ver. Krebsbek.* 1. 54-68.

The infective agent of fowl sarcoma is present in the tumour tissue in rich concentration. When examined spectrographically in ultra-violet light it showed an absorption band with a maximum of  $2,800 \text{ \AA}$ . It is therefore thought that the infective agent is a protein which contains a phosphorus group.

—SASSENHOFF (MUNICH).

VAN ROOYEN, C. E., & RHODES, A. J. (1937). **Centrifugation of the Elementary Bodies of Infectious Myxomatosis of the Rabbit.**—*Zlb. Bakt. I. (Orig.)*. 140. 117-120. 3 tables. [2 refs.] [In English].

Infective rabbit testes were ground up and inoculated into the scarified corneas and conjunctivas of each of three rabbits. These sites were repeatedly washed out with sterile saline until the death of the rabbits. Part of the suspensions so obtained were centrifuged at 15,000 r.p.m. for two hours; the deposits were resuspended in saline. Elementary bodies were shown microscopically to be present in large numbers in the deposit, and absent from the supernatant. Uncentrifuged washings were kept as control material.

It was shown by intradermal inoculation into rabbits that the resuspended deposit and the uncentrifuged washings, when diluted to 1:1,000-1:10,000 caused typical papules, resulting in the death of rabbits. No papules were caused by the supernatant fluid when used undiluted. The authors concluded that the elementary bodies are the infective agent of infectious myxomatosis.—L. E. H.

KASAHARA, S., DEI, K., UYEDA, M., OKAMOTO, Y., HAMANO, R., YAMADA, R., & TSUBAKI, S. (1938). **On a Filtrable Virus Isolated from Rabbits.**—*Kitasato Arch.* 15. 31-39. 2 figs. on 1 plate, 2 tables, 3 charts. [8 refs.] [In English].

The authors isolated 5 strains of a new filtrable virus (passed through a Berkefeld V filter) during passages through rabbit testicles of filtrates from human cases of influenza, typhus fever and measles. They call it "rabbit virus" and found that it was immunologically similar to variola-vaccinia virus, but further work is necessary before its identity can be determined.—R. FISHER.

COLES, J. D. W. A. (1936). **A Rickettsia-Like Organism of the Conjunctival Epithelium of Cattle.**—*J. S. Afr. vet. med. Ass.* 7. 221-225. 8 figs. [7 refs.]

An organism of the rickettsia type, seen in smears of conjunctival scrapings from cases of ophthalmia in cattle is described. It is minute, pleomorphic, intracellular Gram-negative and non-acid-fast. The name *Rickettsia conjunctivae bovis* is provisionally suggested. The parasites are often difficult to find. The vector

has not been determined, but the organism can be transmitted directly from eye to eye without the development of any discernible symptoms.—E. M. ROBINSON.

GEAR, J. H. S., & DOUTHWAITE, M. (1988). **The Dog Tick *Haemaphysalis leachi* as a Vector of Tick Typhus.**—*S. Afr. med. J.* **12**. 53-55. 5 figs. [1 ref.]

A case is described where a dog tick, *H.l.*, taken from a dog with septic tick bites, was crushed, emulsified and inoculated into a male g. pig intraperitoneally. The animal developed a febrile reaction and marked scrotal swelling. Rickettsiae were demonstrated in the tunica vaginalis. The strain was found to be identical with tick typhus from cases in man.—E. M. ROBINSON.

### PARASITES IN RELATION TO DISEASE [ARTHROPODS]

KALMYKOV, E. S. (1987). Nočnaja pastjba, kak sposob zaščityi životnyh ot massovogo napadenija krovososuščih nasekomyh i ovodov. [**Night Grazing as a Means of Protecting Animals from Attacks of Blood-Sucking Flies**].—*Sovyet. Vet.* **5**. 13-15. 2 tables.

K. recommends night grazing, and stabling by day, for the protection of cattle from attacks of blood-sucking flies.

BARANOV, N. (1988). K poznavanju golubačke mušice VI (Studij golubačke mušice i njezinih sinbiocenonta). [**Studies on the Golubatz Midge, VI**].—*Vet. Arhiv.* **8**. 313-328. [2 refs.] [German summary]. [See also *V. B.* **8**. 31].

After a short account of the plague of *Simulium* flies into Yugoslavia in 1937, which was a moderate one, B. gives a description of both larvae and pupae of a new species, for which a new genus, *Echinosimulium* was created; the fly is named *E. echinatum*. The sub-genus *Danubiosimulium*, has been promoted to a genus. Finally B. gives a list of arthropods caught on the wing in nets along with adult *Simulium* flies.—B. OSWALD (KRIŽEVCI).

KISSILEFF, A. (1988). **The Dog Flea as a Causative Agent in Summer Eczema.**—*J. Amer. vet. med. Ass.* **93**. 21-27. [9 refs.]

Summer eczema is described as a dermatitis resulting from continuous scratching or biting; its origin has been variously ascribed to food allergy, diet, worms, disease and heredity. K. suggests that it is essentially a response to flea bite. In nearly 700 dogs examined, he found a correlation between infestation and the disease, and describes an experiment showing that a dog, subject to summer eczema, developed a comparable train of symptoms in response to flea bite. Only certain dogs are highly sensitive to flea bite, but in such dogs successive bites are believed to renew itching in previous puncture sites, and mechanical friction similarly is thought to reawaken latent irritation.—J. MACLEOD.

ANON. (1987). Ante-proyecto de ley de lucha contra la garrapata. [**Draft of a Law against Ticks**].—*Bol. mens. Direcc. Ganad. Montevideo.* **21**. 505-519.

This law aims at the eradication of ticks in Uruguay. Some £800,000 is provided for the campaign, and £20,000 would be allocated yearly to give effect to the project. Owners, or persons in charge of stock will be obliged to maintain them "tick-free". The country will be divided into northern and southern zones by the Rio Negro, and the campaign will start in the south. Animals infested with live ticks may not be moved from their farms. Fines on a sliding scale for the

infraction of the many clauses are provided for, and declaration of infected premises is obligatory. The clearing up is to begin with simultaneous dippings of bovines and equines every 14-18 days until elimination. Sheep affected with *Boophilus microplus* will be similarly treated.

Stations for inoculation against "tristeza" in animals going to zones or countries where ticks exist are provided for, and also inspection stations at different transit points. Animals in transit which are found infested will be dipped (under police supervision if necessary) at the nearest available dipping place with some approved preparation at six-day intervals.—A. H. HUNTER.

MACLEOD, J. (1938). **Parasites of Sheep. Bulletin No. 2. The Sheep Tick, *Ixodes ricinus*.** pp. 27. 3 text figs., 4 figs. on 2 plates. London: Cooper Technical Bureau. [8vo].

This is written in non-technical language primarily for sheep farmers, though it is a very useful summary of tick-borne sheep diseases of the United Kingdom for veterinary surgeons.

The life-history of *I.r.* is given, and then louping ill and tick-borne fever are well described as examples of important causes of loss due to the tick. The importance of acclimatization of sheep on tick farms in Scotland and north England is then discussed and mention made of the stock diseases transmitted by *I.r.*—bovine piroplasmosis, louping ill in cattle and direct injury from tick bites.

Three methods of control for the tick are discussed:—serial dipping at short intervals, the use of protective dips (*i.e.*, dip substances which remain active for some time after the actual dipping), and combined serial dipping plus starvation of ticks. M. advocates the gradual "deticking" of farms by sections, the ticks on each section being destroyed by:—(a) collecting them on small lots of sheep which are then dipped repeatedly at weekly intervals in early summer, and (b) a natural process of starvation of surviving ticks during winter.—J. E.

DELPY, L. (1938). Les espèces iraniennes du genre *Haemaphysalis* Koch 1844. Identité d'*Haemaphysalis choldskyi* Olenov 1928 et d'*H. cinnabarina* var. *cretica* Senevet et Carninopetros 1936. [**Iranian species of *Haemaphysalis* Infesting Domestic Animals**].—*Ann. Parasit. hum. comp.* 16. 1-10. 4 figs., 8 tables. [9 refs.]

Four species of *Haemaphysalis* have been recorded from Iran, *viz.*, *H. cinnabarina punctata*, *H. choldskyi*, *H. concinna*, and *H. inermis*. These were all recovered from cattle, sheep or horses in the relatively humid and temperate regions near the Caspian Sea. *H. choldskyi* was obtained at altitudes up to 3,000 metres.

D. suggests that *H. cinnabarina punctata* is synonymous with *H. choldskyi*, which deserves specific rank. Distinguishing characters for the females of *H. concinna*, based on examination of reared specimens, and a key for the identification of the adults of the four species, are given.—J. MACLEOD.

COLAS-BELCOUR, J. (1937). Observation de lésions pathologiques chez des tiques du genre *Hyalomma*. [**Pathological Lesions in *Hyalomma* Ticks**].—*Bull. Soc. Path. exot.* 30. 876-878. 1 fig. on 1 plate. [3 refs.]

The author describes a pathological condition of the integument of two *Hyalomma* females, similar to that already described for this species by Russian workers [*V.B.* 4. 618]. Numerous small white vesicles were found distributed over the dorsal and ventral surfaces, and particularly along the lateral grooves. They apparently bore no relation to the glands of the integument. Mycelial filaments could not be demonstrated.—J. MACLEOD.

PIGOURY, L., BORDE, R., & NEMEH, E. (1938). Quelques remarques sur la gale sarcoptique du chien : syndrome juvénile. Contagiosité au chien et à l'homme. [**Sarcoptic Mange in Dogs. Danger of Human Infection**].—*Rev. Med. vét., Toulouse*. **90**. 32-38. [6 refs.]

The length of time that elapsed between infection and the appearance of clinical symptoms of mange in dogs was 15-21 days. It was not necessary to take deep skin scrapings in order to demonstrate the parasite. The incubation period of canine mange affecting human beings is approximately 15 days.—H. BURROW.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

SRIVASTAVA, H. D. (1938). **Helminthology in Relation to Veterinary Science**.—*Indian J. vet. Sci.* **8**. 113-118. [9 refs.]

Special stress is laid on the vast economic loss in all parts of the world from internal parasitism. In tropical countries this loss is particularly severe.

A brief account is given of the important helminth diseases of equines, ruminants, poultry, and canines, and reference is made to the importance, from a public health viewpoint, of the intercommunicability of some of the conditions between these animals and man.—D. D. OGILVIE.

DAVIES, T. I. (1938). **Some Factors Governing the Incidence of Helminth Parasites in the Domestic Duck**.—*Welsh J. Agric.* **14**. 280-287. 3 tables. [3 refs.]

An attempt is made to correlate the incidence of helminth parasites of ducks with the geographical position and physical nature of the feeding ground of the birds.

The rate of movement of surface waters largely determines the extent of infestation. Very few helminths occur in birds which feed in rapidly moving streams. Stagnant farm yard ponds, on the other hand, form ideal conditions for completion of the parasite life-cycle.

Trematodes appear to predominate in the ducks of southern England, while cestodes are of greatest moment in mid and south Wales. Trematodes in the latter region are unable to complete their cycle because, with insufficient lime in the rivers, snails cannot develop.

A list of the helminths of 29 ducks examined at Aberystwyth is incorporated.  
—D. D. OGILVIE.

AMEEL, D. J. (1938). **The Morphology and Life Cycle of *Euryhelms monorchis* (Trematoda) from the Mink**.—*J. Parasit.* **24**. 219-224. 5 figs. [5 refs.]

A new species of small heterophyid trematode, *Euryhelms monorchis*, was collected from the small intestine of mink in Ohio and Michigan, U.S.A. Its characters follow closely those of the genus, except that its one testis is either absent or very transitory, and there is no seminal vesicle. The life-history is typical of the Heterophyidae, the first intermediate host being the operculate snail, *Pomatiopsis lapidaria*, while frogs and tadpoles serve as the second intermediate hosts. The cercariae are atypical in that they lack eyespots, and specialized spines at the oral aperture. The morphology and life-cycle of the fluke are discussed in detail. Rats and a cat have been infected experimentally. According to Witenberg's classification, the new species should be considered as an aberrant form of the sub-family Heterophyinae.—D. D. OGILVIE.

AFRICA, C. M. (1938). **An Attempt to Elucidate the Filtration of Eggs of Certain Heterophyid Trematodes into the General Circulation.**—*Philipp. J. anim. Indust.* 5. 187-200. [12 refs.]

Examination of the intestine of mammals and birds showed that, at any rate in the case of *Haplorchis yokogawai*, a large number of flukes invade the interior of the mucosa, usually *via* the orifices of the intestinal glands. In birds A. found evidence that the villi could engulf the flukes in an amoeboid manner. Such a finding substantiates previous work on this subject. Once having passed into the mucosa, it would appear that the flukes never return to the lumen of the gut. This observation, together with the fact that the tissues show little or no reaction to live flukes, suggests that sexual maturity is attained in the gut wall, where egg filtration occurs into the contingent lymphatics and blood vessels.

Kittens provided an exception to the general findings. In no case could filtration be detected in them. Negative results in this respect were also recorded in an owl and a pelican.

Experimental infestation showed that the flukes became ovigerous six days after ingestion and attained full development in about 12 days.—D. D. OGILVIE.

ANON. (1937). A los señores hacendados y pobladores de la campaña. La dirección de ganadería reclama su concurso para la lucha contra la hidatidosis. [Control of Echinococcosis].—*Bol. mens. Direcc. Ganad. Montevideo.* 21. 388-393.

This is an appeal to disinfest dogs and to burn or bury dead animals. Frigorífico statistics for 1936 show that out of 833,806 cattle slaughtered, 83% of the adults and 93% of the young stock were affected. This represented a loss of some £100,000, the value of the livers of the affected cattle.—A. H. HUNTER.

I. KERR, K. B. (1938). **The Cellular Response in Acquired Resistance in Guinea Pigs to an Infection with Pig Ascaris.**—*Amer. J. Hyg.* 27. 28-51. 4 figs. on 1 plate, 2 tables. [Numerous refs.]

II. KERR, K. B. (1938). **Attempts to Induce an Artificial Immunity against the Dog Hookworm, *Ancylostoma caninum*, and the Pig Ascaris, *Ascaris lumbricoides* suum.**—*Ibid.* 52-59. 2 tables. [12 refs.] [See also *V.B.* 7. 611].

I. A continuation of K's work on the exact pathology of helminths has shown that a definite resistance can be acquired by g. pigs against the larval stages of *A.l. suum*. An otherwise lethal dose of ascaris eggs can be withstood if the subject is "immunized" in the first instance with either single or multiple sub-lethal doses. Such resistance, however, is not sufficient to enable the g. pig to withstand more than twice the lethal dose, and it is of short duration.

The cellular reactions to infection of both resistant and non-resistant subjects were studied. The resistant g. pigs in general showed greater response, especially in the liver, which is concluded to be the most important organ of defence against the larvae. It is believed that the stimulation of the cellular response is due to an antibody formed by previous infection. A number of contradictory points require elucidation.

II. In view of the conflicting results of previous work in this field, an attempt was made to immunize mice against *Anc.c.* and g. pigs against *A.l. suum*. A large number of antigens were prepared by treatment of both adult worms and larvae, but the results in all cases were inconclusive. Ascaris antigen will produce hypersensitivity of the subject, but it is not established that immunity will follow.

[It seems possible that the test doses used in these experiments may have been

too large. In such an event any immunity which was present would have been overwhelmed and hence undetected].—D. D. OGILVIE.

ORTLEPP, R. J. (1937). **Whipworms from South African Ruminants.**—*Onderstepoort J. vet. Sci.* **9**. 91-100. 7 figs. [13 refs.]

O. discusses the morphology and the occurrence in South Africa of *Trichuris globulosa* (var. Linstow). In addition he describes three new species, namely *Tr. barbertonensis* from cattle, *Tr. antidorchi* from springbok and blesbok and *Tr. parvispiculum* from goats.

LIEKE, P. (1938). Ueber den Einfluss von Kalidüngemitteln auf die Eier und Larven der Pferdestrongylien. [**Effect of Potassium Fertilizers on the Eggs and Larvae of Horse Strongyles**].—*Dtsch. tierärztl. Wschr.* **46**. 197-203. [Numerous refs.]

L. tested the action *in vitro* and in manure of kainit,  $K_2SO_4$ , potassium-magnesium sulphate, and a nitrophosphate fertilizer on the eggs and larvae of horse strongyles. To kill the eggs, a minimum strength of 10% kainit acting for four days, or a 20% solution of  $K_2SO_4$  acting for six days, was necessary; the other two substances were practically useless. Tests suggested that the kainit owed its vermicidal action to KCl, a 5% solution of which killed eggs in 48 hours, and to NaCl, of which 0.9% quickly destroyed eggs, but a saturated solution did not, even after ten hours.

Newly hatched larvae were killed by 15% KCl in 24 hours, by 10% KCl in 48 hours, and by 5% NaCl in 24 hours. Heavily infested faeces were diluted and mixed with kainit, kainit plus  $CuSO_4$  or with chalk-urea ("Kalkharnstoff", containing 20% N and 48%  $CaCO_3$ ) in concentrations corresponding to those which would be used in dressing land, results being given in weight used per hectare. Kainit (32 cwt per hectare) killed all the eggs within five days, kainit plus  $CuSO_4$  (4:1 at 7 cwt per ha.) killed all eggs in three days. Chalk-urea (7 cwt per ha.) was ineffective against the eggs.

Tests were next made on infected faeces dropped or scattered on the surface of soil placed in boxes, the fertilizers being added to different samples dry as well as in solution. Kainit, both dry and in solution, arrested the development of larvae when applied in concentrations of 12, 16 or 32 cwt per ha. Kainit plus  $CuSO_4$  (4:1, 4:2 or 4:3 at 6 or 7 cwt per ha.) had the same effect, while chalk-urea (7 cwt per ha.) was inactive: 32 cwt of a mixture of 1 part of slaked lime to 4 parts of kainit per ha. killed the eggs in a few hours.

The article contains many quotations from similar work by others.—J. E.

SCHWARTZ, B. (1938). **Trichinosis in Swine and its Relationship to Public Health.**—*J. Amer. vet. med. Ass.* **92**. 317-355. 1 fig., 1 table. [16 refs.]

S. gives a description of trichinosis in swine, and mentions important outbreaks of human trichinosis in Germany. In the U.S.A., out of 6,662 samples of pork obtained from grain-fed pigs, 60 (0.91%) were found to be infested. Of 6,684 samples from pigs fed on garbage as collected, 286 (4.41%) were infested. Of 19,870 pigs fed on cooked garbage only 11 (0.55%) were infested. He concludes, therefore, that the feeding of uncooked garbage favours the spread of trichina infestation among pigs, owing to the presence of infected pork, and that cooking of garbage reduces the incidence.

The examination was carried out by the digestion method; this is more precise than the microscopic method, in which trichinae are often overlooked. Figures obtained as a result of experimental infection of pigs with varying doses

of trichina larvae showed that the host animal in question presented no readily recognizable symptoms when the resulting infestation was due to less than 500-900 larvae per gram of diaphragm muscle tissue. Pigs with heavier infestation showed clinical symptoms during the active stage of the disease (wandering stage) *e.g.*, digestive disturbances, muscular stiffness, inappetence, fever and oedema—all symptoms which are not pathognomic of any particular swine disease.

Methods of control and eradication involve improved husbandry, elimination of meat from scrap barrels, and the control of rats. Since human beings acquire trichinosis as a result of eating raw or insufficiently cooked pork, or food-products containing affected pork muscle tissue, public health officials should educate the public on the dangers of eating any but well cooked pork.—M. F. BENJAMIN.

ORTLEPP, R. J. (1937). **A Hitherto Unrecorded *Filaria*, *Suifilaria suis*, N.G., N.Sp., from the Domestic Pig in South Africa.**—*Onderstepoort J. vet. Sci.* 9. 85-89. 3 figs. [6 refs.]

O. describes a new filaroid parasite found free or encysted in the fasciae of the muscles of the domestic pig. The males are 17-25 mm. long, and the females, 32-40 mm. long. They are characterized by the presence of two auricular-like structures near the mouth, the presence of a small buccal capsule, the vulva very near the mouth, two unequal and dissimilar spicules, the tail of the female truncated and tuberculate, and the tail of the male coiled, alate on one side and carrying six pairs of small papillae.

KEMPER, H. E. (1938). **Filarial Dermatitis of Sheep.**—*N. Amer. Vet.* No. 9. 19. 36-41. 2 figs., 1 table. [2 refs.]

A hitherto unrecorded dermatosis of sheep is described, from Catron County, New Mexico. The condition occurs in ewes, mostly between two and six years old, in limited areas of the country. Lambs and rams are never affected. The lesions occur on the poll, face, abdomen, and feet, and are characterized by a chronic dermatitis, with tissue proliferation, furunculosis, and intense pruritus. Scab formation occurs in recurrent cycles over a long period; there is little tendency for the original lesions to increase in size unless through rubbing.

Examination of the skin of diseased areas revealed the presence of a new species of microfilaria, *Elaeophora schneideri*. On autopsy, numerous adult helminths were found in the carotid, mesenteric and iliac arteries. A consideration of the condition suggests that an arthropod intermediate host probably plays a part in the life-cycle of the parasite.

Local treatment was of no avail, but foudain intramuscularly in doses of 4-8 c.c. daily till at least 88 c.c. had been given was specific.

This is thought to be the first instance in which blood-inhabiting filarids have been recorded in sheep.—D. D. OGILVIE.

## IMMUNITY

DOWNHAM, K. D., & VENN, J. A. J. (1938). **Tuberculin Testing of Ducks.**—*Vet. Rec.* 50. 431-432. 4 plates.

The site most commonly used for the intradermal tuberculin test in ducks is the web of the foot. For a number of reasons this site is unsatisfactory. The capillary blood supply is poor, and the amount of connective tissue is considerable. The authors tried the intradermal tuberculin test on the skin of the back of the neck, the site having been denuded of feathers. The skin at this point being very

thin, a fine needle, such as No. 19, was used, and the dose employed was 0.1 c.c. of the special avian tuberculin. Positive reactors showed oedematous swelling in 24 hours.

The method was employed in artificially infected ducks, and in normal ducks intended for export. [The number of ducks examined P.M. to check the results seems to have been inadequate].—D. L. HUGHES.

ZDRODOVSKIĬ, P. (1937). Problema allergičeskoj diagnostiki brucelleza. (Liter.-kritičeski očerk). [Allergic Diagnosis of Brucellosis. A Critical Review]. —*Brucellosis in Sheep*. pp. 205-224. [Numerous refs.] Moscow: Viem Publ. Dept.

In giving a general review of the literature dealing with methods for diagnosing brucellosis in man and in animals, Z. points out advantages of the allergic tests method over the bacteriological and serological methods; the two latter, besides being laborious, require the installation of special laboratories and the co-operation of well-trained specialists, thus rendering their use prohibitive for wide-scale practice. [Z. contemplates the issue of a useful skin-test preparation to shepherds so that they might do their own tests].

He adduces evidence both from literature and from the work of the Commission of which he was in charge to show that the allergic reaction is specific and constant in animals either naturally or experimentally infected with brucellosis. From his own experience he states that in human beings who are either chronically affected with brucellosis or latent carriers of the infection, inhalation of dried brucella cultures or of atomized suspensions causes a febrile condition, accompanied by headache, pains in the joints and muscles, asthma, and a psychic condition (euphoria).

Extensive trials by the Commission demonstrated that antigen preparations so far used in the West, such as the English and French brucellin or the Italian anabartin, are unsatisfactory in that the reaction they cause is not always constant in its manifestations, and in that they tend frequently to cause the formation of hard infiltrations, their diagnostic value being thereby obscured. A further disadvantage of these preparations in the opinion of the Commission, is that they do not constantly react specifically, and that all have a marked sensitizing effect on the animals tested, rendering the latter unsuitable for subsequent control tests at intervals of time that are useful in practice. On the other hand "brucellysate", as prepared by the Commission, marks a very considerable advance, since it has little, if any, sensitizing action on healthy animals, and has only a very slight tendency to give non-specific reactions.

In 1933 and 1934 "brucellysate" was prepared by repeated washing of living three-day-old brucella cultures [the strain is not specified in this paper, but in a following paper—see p. 97—it is stated to have been derived from a living culture of *Br. suis* received from DUBOIS], grown on glucose or liver agar [preparation not described], and centrifuged in physiological solution; the resulting bacterial mass is dried in a high vacuum and then, while still alive, ground in a mortar with quartz sand until the bacterial cells are thoroughly triturated; the residue is then extracted in physiological solution or in a boracic buffer solution (pH 7.6 to 8.0), at the rate of 1 g. dry bacterial mass to one litre of the solution. The extract is passed through a bacterial filter candle [type not stated] and its nitrogen content is titrated, as determined by Kjeldahl's method. Before being enclosed in sealed ampoules the extract may be heated for one hour at 60°C. without destruction of any of its properties. It is claimed that this method gives a very constant, practically standardized amount of bacterial protein, and further

that it possesses the advantage of being a very nearly pure solution of the protein, with only a slight admixture of fragments of bacterial cell walls, which improved methods of purification may eventually eliminate.

The working dose for allergic tests on sheep is 0.2-0.3 c.c. of the extract, containing from 0.00001 to 0.000015 mg. nitrogen.

The remainder of the paper is devoted to a brief discussion of the excellent results reported to have been obtained by the Commission on the experimental farm with "brucellysate", chiefly in the building up of healthy flocks from the diseased stocks [see below].

ZDRODOVSKIĬ, P., VOSKRESENSKIĬ, B., & GOLINEVIC, E. (1937). O sensibilizirujuščih svojstvah brucellora i brucellizata. [**Sensitizing Properties of "Brucellore" and "Brucellysate"**].—*Brucellosis in Sheep*. pp. 251-256. 3 tables. Moscow: Voen. Publ. Dept.

The experiments described in this paper were carried out at the Sukhum (Black Sea littoral) Branch of the All-Union Institute of Experimental Medicine, independently of the Commission to North Caucasus, for the purpose of determining the sensitizing properties of "brucellore" (prepared in the usual way from emulsions of a strain of *Br. suis* received from DUBOIS, which were killed by heating at 70°C.) and "brucellysate" prepared from the same strain. The tests were made on a total of 125 healthy ewes and 36 rabbits which received from one to ten injections (subcutaneously, intradermally, or intravenously) of 1 c.c. of either preparation. The results showed that, when tested 15 days after the last injection with 0.1 c.c. of either preparation, none of the animals treated with "brucellysate" showed any noticeable sensitization to that antigen, but ewes which had received three or more injections exhibited a slight local reaction when subsequently tested with "brucellore". On the other hand, a single injection of "brucellore" by any route was sufficient to cause, in a high percentage of the animals, a noticeable, and in some cases even well-marked sensitization to subsequent intradermal injection of either antigen, sometimes accompanied by definite necrosis at the point of injection.

[The preparation "brucellore" appears to have been an ordinary heat-killed suspension. In other papers of the series contained within this publication the term "brucellin" is frequently used. It is not clear whether the terms "brucellin" and brucellore used in this series of papers refer to different preparations or not].

ZDRODOVSKIĬ, P. (1937). Allergičeskaja diagnostika brucelleza u ovec s pomoščju brucellizata i brucellina. [**Allergic Diagnosis of Brucellosis in Sheep by Means of "Brucellysate" and Brucellin**].—*Brucellosis in Sheep*. pp. 257-293. 13 tables, 2 graphs, 2 diagrams. Moscow: Voen. Publ. Dept.

A detailed account is given of an extensive range of tests, during the three years of the Commission's activity on the North Caucasus Experimental Farm, to determine the relative merits and demerits of brucellin and "brucellysate", both of which were prepared from the same strain of *Br. suis*, received from DUBOIS.

Z. states that, owing to the lack of adequate laboratory installation and equipment, the "brucellysate" prepared during the first two years varied somewhat in quality, probably because of defective standardization of its protein content, and that the reactions it caused were not constant. A considerable improvement of the preparation was attained by the following technique:—three-day-old cultures of the organism, grown in Erlenmeyer flasks on glycerin-glucose agar or liver agar [preparation not described] with a pH value of 6.8, are washed off with physiological solution and centrifuged until they are entirely freed from any trace of the

nutrient substrate and from autolytic products of the bacteria. The thick bacterial mass is then dried in a high vacuum in the presence of a sufficient quantity of calcium chloride, in order that the process may be completed overnight, and thus ensure that the bacteria are still living when subjected to trituration. This precaution is stated to be extremely important in order to avoid any alteration (denaturation) of the bacterial proteins by autolysis, and is claimed to be the essential feature distinguishing this method from those employed outside the U.S.S.R. The dry bacterial mass is then ground in a Jouan (Paris) bacterial mill with stainless steel balls, and the resulting completely amorphous mass is extracted with either physiological solution or a boracic buffer solution (pH 8.0-8.2), in the proportion of 200 c.c. solution to 1 g. of the dry bacterial mass, and is filtered through a Chamberland filter. The filtrate, a completely clear liquid, is termed "brucellysate". Its nitrogen content is titrated, and for use it is diluted to contain about 0.005% nitrogen; the working dose for a sheep is 0.2 c.c., given intradermally.

In the remainder of the paper Z. discusses at length the technique of the allergic tests on sheep, as well as such points as the normal course of the reactions, including weak or doubtful reactions, the specific nature and diagnostic value of the reaction, the phenomenon of desensitization of the animals through repeated injections of brucellin and "brucellysate", the effect on the reaction of inter-current infections or other pathological conditions, the sensitization of healthy animals by "brucellysate", and the possibility of using the allergic tests for the building up of healthy flocks in those regions in which where the disease is epizootic. He considers that the results of the work performed by the Commission have amply proved that, of all the methods so far recommended for the diagnosis of brucellosis in sheep, the allergic test with "brucellysate" is of outstanding value because it is highly sensitive, and the reactions it causes are specific. [There does not appear to be any evidence that the method used for the preparation of "brucellysate is different in any significant respect from that used by R. M. TAYLOR—*V.B.* 6. 111].

OTERO, P. M., & GONZÁLEZ, L. M. (1938). **Purified Protein Antigen from *Brucella*.**—*Proc. Soc. exp. Biol., N.Y.* 38. 703-705. 1 table. [8 refs.]

A modification of Seibert's method for the preparation of purified protein derivative from tuberculin [*V. B.* 3. 714, and 6. 55.] was applied to a carboll-saline suspension of *Br. abortus* to obtain a standard preparation which would serve as a good antigen, could be accurately measured, and would undergo the least possible denaturation. The final protein product was fairly constant in nitrogen and polysaccharide content, was thermostable, easily soluble in alkaline solution, and gave positive precipitin and complement-fixation tests with the sera of rabbits inoculated with brucella. Intradermal injection of 0.005 mg. into g. pigs, previously infected with brucella, caused a definite skin reaction lasting more than 48 hours.

—R. O. MUIR.

BLAGOWECHENSKY, N. N. (1938). *Durée du séjour de l'antigène dans l'organisme et immunité. [Connexion entre Immunity and the Duration of the Antigen in the Organism].*—*Rev. Immunol.* 4. 161-174. 2 tables. [11 refs.]

B. used an alum precipitated diphtheria anatoxin on 40 g. pigs. All were injected (intraderm.) in the flank with 0.1 c.c. doses, and the skin at the injection site was excised aseptically from about half of them, the intervals covered being 1, 3, 5, 10, 20, 30 and 45 days. These pieces of skin were examined for alum, which was found in most cases. A histological lesion was invariably present at the 45th day, although not seen macroscopically at this stage.

The biopsied and control g. pigs were submitted to the Schick test (once only in most cases) and their serum antitoxin was titrated at short intervals, these tests being made 12-18 months after the immunization. Final tests were made by injecting large doses of toxin. A high degree of immunity was conferred by the one injection, but the antitoxin reaction was very variable and there was no significant difference between the antitoxin titre of the biopsied and the other test animals. No definite correlation between a Schick reaction and antitoxin titre could be determined in g. pigs. The latter was generally more persistent. The slow absorption of this type of anatoxin, which was favoured by the dermal injection and took at least 45 days, appeared to be in proportion to its immunizing power.

—C. V. WATKINS.

KESTNER, O. (1938). **Antibodies Organ-Specific against the Anterior Body of the Pituitary Gland.**—*J. Physiol.* **92**. 273-275. 3 tables. [4 refs.]

A serum was prepared by injecting rabbits repeatedly with a simple saline extract of bovine anterior pituitaries. The injection of such a serum into rats considerably reduced the specific dynamic action of ingested raw meat and slowed the basal metabolic rate.—J. M. ROBSON.

LANDSTEINER, K., & PIRIE, N. W. (1937). **Serological Specificity in Pyridine Derivatives.**—*J. Immunol.* **33**. 265-270. [15 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **13**. 158. Signed W. W. C. TOPLEY].

The authors record a series of experiments on the specificity of synthetic azoprotein antigens prepared from pyridine derivatives. Using three antigens prepared from 3-amino pyridine, 3-amino-2-carboxy pyridine and 3-amino-4-carboxy pyridine, cross precipitation tests showed almost complete specificity, the only exception being a trace of precipitation with an antigen prepared from 3-amino-4-carboxy pyridine, and an antiserum against 3-amino-2-carboxy pyridine.

As in other cases, inhibition reactions showed less specificity than the direct precipitin tests. Thus pyridine was found to inhibit the reaction between 3-amino pyridine and the homologous antiserum, and various carboxy derivatives inhibited the reaction between the 3-amino-4-carboxy pyridine, or 3-amino-2-carboxy pyridine, and the corresponding antiserum when the substance tested for inhibition had a carboxyl group in the same position with reference to the nitrogen of the pyridine ring as that occupied by the carboxyl group of the synthetic antigen.

## DISEASES, GENERAL

- I. MANNINGER, R., & KOTLAN, A. (1938). Influence des conditions de l'élevage, de l'alimentation et de l'entretien des animaux sur la genèse, l'évolution et la persistance des maladies infectieuses et parasitaires. [**Influence of Animal Husbandry and Nutrition on Infectious and Parasitic Diseases**].—*Bull. Off. internat. Epiz.* **16**. 62-82. Discussion pp. 376-390.
- II. WAGENER, K. (1938). Influence des conditions de l'élevage, de l'alimentation et de l'entretien des animaux sur la genèse, l'évolution et la persistance des maladies infectieuses et parasitaires des animaux domestiques. [**Influence of Animal Nutrition and Husbandry in Infectious and Parasitic Diseases in Domestic Animals**].—*Ibid.* 84-121. Discussion pp. 376-390.

I. This report deals in general terms with the effect of environmental factors on the genesis of contagious diseases in animals. The authors analyse the role of exposure and susceptibility in the causation of animal disease. They examine

the relationships between the incidence of various animal diseases and the systems under which the animals are kept—*e.g.*, in stables or at pasture. The survival of disease-causing agents outside the animal body has an important bearing on this aspect. Susceptibility, on the other hand, depends on the complex interaction of the hereditary and acquired characters of the animal. The latter are discussed with relation to the conditions of housing, work, feeding and rearing. Parasitic infestations are dealt with from the following aspects:—degree of infestation, species resistance, age susceptibility, the effect of superimposed infestation with two or more parasites, and the effect of nutritional factors.

II. In this report W. limits his observations to the influences which feeding, rearing and maintenance exert on predisposition to infection with bacterial and parasitic agents. He points out that in the domestication and artificial selection of animals man has tended to lower their natural resistance to disease; contributory factors to this are early maturity, housing and feeding. In his opinion, the methods of feeding animals under conditions of domestication play the most important part in predisposition to disease. He discusses the significance of protein-rich diets used in intensive production methods; the troubles arising from such diets are said to be the result of maladjustment between minerals, vitamins and excess proteins. There is as yet little information available regarding the relationship between vitamins A, C and D and the infectious diseases of domestic animals. An important conclusion is that the feeding and maintenance of domestic animals is intimately related to the aetiology of reproductive disorders.

—N. J. SCORGIE.

- I. MARCZEWSKI. (1938). **Bovine Tuberculosis and Brucellosis in Poland.**—*Mon. Bull. agric. Sci.* **29**. 148T-149T.
- II. VAN GOIDSENHOVEN, C., & BOES, J. (1938). **Bovine Brucellosis and Tuberculosis in Belgium.**—*Ibid.* 190T-198T.

I. The cases of TB. in Poland verified after slaughter at abattoirs amount to 8%. Compulsory notification is necessary for TB. of the udder, lung, uterus and intestines, and in udder infection slaughter is compulsory and is compensated. In other cases slaughter may be ordered according to circumstances. A voluntary control system is also in force in which Government assistance is limited to sanitary inspection, clinical examination and tuberculin testing.

Contagious abortion is not notifiable. Control schemes have been drawn up and will shortly be undertaken on farms on which TB. control is also practised in accordance with approved plans. The plans for abortion control are of three types:—(a) disposal of reactors; (b) semi-isolation, and (c) segregation of cattle both when confined and at pasture, and the subjection of fresh stock to very strict measures [not specified]. The most suitable plan for each farm will be selected by agreement. Special accommodation for calving must be provided.

II. Both the diseases dealt with are prevalent, but are not legally notifiable. It is estimated that of 960,000 dairy cows in Belgium, 10% abort annually, with a loss of 148 million litres of milk. *Brucella* infection appears to be increasing, and in 1936, 3,640 positive results were found in 8,492 tests. Voluntary control is encouraged by free testing, and live vaccine is only issued when infection is severe.

Some 15,000 cattle are affected annually with TB. Compulsory preventive measures have been replaced by voluntary control, which includes government certification of free herds, nullification of sale of infected animals, and subsidies to associations undertaking collective control. Imported cattle are inspected and in approved cases quarantined pending tuberculin tests. The ophthalmic and

intradermal tests are used, and also the subcutaneous test in doubtful cases. Positive reactors are returned to the country of origin.

No systematic study has yet been made in Belgium on the transmission of these diseases to man. Human brucellosis exists, but appears to be very limited in extent.—S. J. GILBERT.

HENDERSON, J. A. (1938). **Observations on Reproduction and Associated Conditions in a Herd of Dairy Cattle.**—*Cornell Vet.* 28. 173-195. 13 tables. [17 refs.]

From the records of a high-producing dairy herd data of veterinary interest are presented.

The average gestation period of all cows was 280.3 days. Left horn pregnancies numbered 43% and right horn 57%, a proportion which is in general agreement with previous figures. Twins were carried, on the average, four days less than single calves. There was some indication that twinning might be associated with ovarian dysfunction.

Although the cattle were brucella-free, 13.9% of pregnancies terminated in abortion, the tendency to abort increasing with age. Dystocia occurred in 13.1% of parturitions, the greater number of cases being in first-calf heifers.

Retained placenta was noted in 12.9% of cases.

Trichomoniasis had serious effects on the reproductive functions, although recovered animals showed resistance.

The greatest incidence of milk fever was at about the fifth calving. No cases occurred with first calves, and very few with second calves. Many were complicated by concurrent conditions. A seasonal susceptibility between May and September was noted.

Acetonaemia often occurred in relation to reproductive conditions, especially with third and fourth calves. Susceptibility increased during the winter months. There was a satisfactory response to glucose medication.—D. D. OGILVIE.

RISER, W. A. (1938). **The Control of the Milk Supply for an Iowa Institution.**—*J. Amer. vet. med. Ass.* 92. 645-652.

An account of the hygienic methods applied to control disease and improve production in a dairy herd of a state institution. In four and a half years calf mortality was reduced from 50% to 5%, *Brucella abortus* infection eliminated, milk production raised from 269 to 429 lb. per cow, and the quality of the milk greatly improved. When the control commenced, 30% of the herd were positive to the agglutination test for *Br.a.* infection, whilst 25 cows were sterile; by the end of the period here dealt with only three cows were under treatment for sterility. [No indication of the number of cattle in the herd is given].—H. E. BYWATER.

TURBET, C. R. (1937). **Veterinary Notes [Diseases in Fiji].**—*Agric. J. Fiji.* 8. No. 4. pp. 37-40.

In 1931 the incidence of bovine tuberculosis in the Suva District, as disclosed by the tuberculin test, was 18%. In 1935 only 0.1% reacted to the test. The inoculation of non-pregnant heifers with live *abortus* vaccine on farms where contagious abortion is rife is an economic measure and the incidence of the disease is greatly reduced thereby. Amongst skin diseases in dogs, laboratory investigation has shown a form of dermatomycosis to be most common. Infectious keratitis occurs fairly frequently amongst cattle.—C. R. TURBET,

- I. MITCHELL, W. M. (1937). "Rheumatic Disease" in the Horse (Osteo-Arthritis and Allied Conditions).—*J. comp. Path.* 50. 282-286. [9 refs.]
- II. KELSER, R. A., & CALLENDER, G. R. (1938). Equine Degenerative Arthritis. —*Vet. Med.* 33. 307-320. 23 figs., 1 table. [18 refs.]
- III. CALLENDER, G. R., & KELSER, R. A. (1938). Degenerative Arthritis. A Comparison of the Pathological Changes in Man and Equines.—*Amer. J. Path.* 14. 253-272. 26 figs. on 5 plates. [14 refs.]

I. This is a brief outline of M's investigations on the chronic disabling diseases of horses [see *V. B.* 4. 375; 6. 444, 7. 435.], in which he summarizes the results of extensive P.M. examinations. In young and old horses suffering from "shivering", the most constant sites of pathological lesions were the joints and the peripheral nerves. Microscopic examination of the femoral and sciatic nerves revealed extensive degeneration of the motor fibres, restricted to localized patches. There was also evidence of wide-spread disease throughout the body, e.g., hyperplasia of lymph nodes, fibrositis of the terminal part of the oesophagus, atrophy of the laryngeal muscles, and gastric ulcers, and M. states that these lesions were probably related to the peripheral nerve degeneration. Stringhalt, partial paraplegia, roaring and probably functional heart disease may also arise from nerve damage. Deficiency of vitamin A and  $\text{CaO} : \text{P}_2\text{O}_5$  imbalance are being investigated as possible factors in the aetiology.

II. This paper presents the results of an investigation into the high incidence of lameness amongst U.S. Army horses and mules in Panama. In a considerable number of the animals which were slaughtered, the most characteristic lesion was found to be a degenerative arthritis involving particularly the joints of the limbs. The pathological findings are described in detail. Macroscopically, the lesions varied from slight grooves and small "blisters", primarily involving the superficial layers of cartilage, to extensive ulceration of the articular surfaces. Histological examination revealed that the changes were non-inflammatory and primarily involved only the articular cartilage; bone changes might occur secondarily, but there was no evidence of any relationship between the productive changes producing spavin, ringbone, etc., and the condition described here. Comparative studies showed that this condition is associated in no way with osteomalacia. It is apparently not of bacterial origin. The pathological changes suggest that the condition is a deficiency disease in which a disturbance occurs in the nutrition of the articular cartilages. The aetiology is discussed with particular reference to minerals and vitamins, without any conclusions being reached.

III. The authors present a comparative study of the lesions of degenerative arthritis in human beings and equines (see also II, above). The gross and histological changes in a series of 60 specimens from human beings and from 54 horses and mules are described. The findings indicate the sequence of events which takes place in the joints in degenerative arthritis. The lesions in human beings and in equines were practically identical in character. The primary degenerative change starts in the cartilage, the earliest lesions being grooves or blisters. This is followed by various degrees of ulceration, until in advanced lesions there is eburnation of the bared bony cortex accompanied by a bony hypertrophy which appears to be of a compensatory character. The production of this new bone always occurs from the calcified matrix and sub-chondral bone, never from the periosteum [cf. spavin]. In man especially the lesions may be symptomless, but animals, presumably owing to their greater physical activity, often show clinical manifestations from less advanced lesions than man.

The aetiology of degenerative arthritis remains undetermined, but the authors suggest that the lesions are due to chemical and physio-chemical changes in the

cartilage. In equines at least there is some possibility that these changes are related to mineral imbalance and/or deficiency in vitamins A and D.—N. J. SCORGIE.

- I. GOMEZ, A. K., & GONZAGA, A. C. (1938). **A Simple and Practical Test for the Diagnosis of Equine Osteomalacia.**—*Philipp. J. anim. Indust.* **5**, 217-220. 3 plates. [2 refs.]
- II. GENEVOIS, & BUCK. (1938). Contribution à l'étude de l'ostéofibrose des équidés à Madagascar. [**Equine Osteofibrosis in Madagascar**].—*Bull. Acad. vét. Fr.* **11**, 410-411.

I. The test described is claimed to be useful in the diagnosis of incipient equine osteomalacia. It consists in the insertion of a small stylet through the facial bones into the frontal sinus at a point mid-way between the inner canthi of the eyes. A positive diagnosis is made if the stylet passes easily through the bones; in a negative case this operation is not possible, as the bones are hard and the animal objects to the pain.

II. A short note dealing with the methods available for the early diagnosis of equine osteofibrosis. For early diagnosis the authors regard estimation of phosphoric acid in the urine and calcium in the blood serum as being the most useful tests. They outline the methods, specially applicable to Madagascar conditions, which they have adopted for the prevention and treatment of the disease.

— N. J. SCORGIE.

HOLE, N. H. (1938). **Three Cases of Nodular Necrosis (Roeckl's Granuloma) in the Muscles of Cattle.**—*J. comp. Path.* **51**, 9-22. 10 figs. [13 refs.]

H. describes three cases in cattle of nodular necrosis in the superficial muscles, particularly the panniculus and the muscles of the tail. The lesions were the size of a hazel-nut, and possessed a dense fibrous capsule surrounding a zone of loose connective tissue which contained leucocytes, plasma cells and pus cells; in the centre there was a necrotic zone. The presence of true giant cells was also noted, but eosinophiles were not seen in the connective tissue zone.

Bacteriological examinations were negative, and although evidence of a sarcosporidial infestation was present, it is considered that the parasites were present in the muscles before the nodular lesions developed, and happened to be engulfed by them. In one case, visible lesions developed to their maximum in about six weeks (from the time of their first appearance) and then underwent spontaneous regression, no visible lesions being seen or felt four months later. It is suggested that lesions have not yet been examined at a sufficiently early stage of development to enable the aetiological agent, if any, to be detected.—J. A. NICHOLSON.

HAGMANN, A. (1938). Beitrag zur Kenntnis der Muskelknoten beim Rinde. [**Muscle Nodules in Cattle**].—*Z. Fleisch- u. Milchhyg.* **48**, 361-365. 1 fig. [9 refs.]

Numerous yellowish-grey, oval nodules of varying size were observed in the neck and abdominal muscles of a 2½-year-old bullock. Histological examination showed that they developed as the result of an infiltration between the muscle fibres, and that, when fully formed, they possessed a well defined capsule composed of connective tissue, isolated muscle fibres, and eosinophiles surrounding a layer of granulation tissue consisting chiefly of spindle-shaped fibroblasts and capillaries. At the centre of the nodule there was a necrotic area, and scattered through this were small collections of cell debris. These appeared as yellowish points which could easily be squeezed out of the general necrotic mass. In the neighbouring muscle tissue several Miescher's tubes were present, indicating an accompanying

sarcosporidial infestation. H. suggests that the muscle lesions were, in fact, produced as a result of such an infestation, and that on occasion, sarcosporidia may produce a chronic inflammatory reaction in muscle.—J. A. NICHOLSON.

BERTHELON, & LABFYRIE. (1938). Observations sur l'anasarque des bovidés. [**"Bovine Anasarca"**].—*Rec. Méd. vét.* **114**. 321-325. 1 fig.

The condition here spoken of as "bovine anasarca" occurs in the Basses Pyrénées, and is characterized by congestion of the skin and mucous membranes, and oedema of the cutaneous and subcutaneous connective tissues, followed by necrosis. Symptoms set in suddenly with a rise of temperature, and accelerated respirations and the characteristic skin changes then develop. The aetiology is unknown, but the condition appears to be infectious and occurs chiefly in the spring.

—J. A. NICHOLSON.

- I. TAYLOR, E. L. (1937). Does Jaagsiekte Occur in Great Britain?—*J. comp. Path.* **50**. 317-320. [7 refs.]
- II. DUNGAL, N., GÍSLASON, G., & TAYLOR, E. L. (1938). Epizootic Adenomatosis in the Lungs of Sheep—Comparisons with Jaagsiekte, Verminous Pneumonia and Progressive Pneumonia.—*Ibid.* **51**. 46-68. 8 figs., 3 tables. [11 refs.]
- III. M'FADYEAN, J. (1938). Jaagsiekte.—*Ibid.* 78-84.

I. It is suggested that the disease described in sheep by M'FADYEAN in 1888 and 1894, and more fully in 1920, may be the same as jaagsiekte in South Africa, "progressive pneumonia of sheep" in Montana and "Deildartunga disease" in Iceland [*V. B.* **8**. 651]. The histological appearances of all four conditions are similar, and the last three are definitely not caused by parasitic worms; the first was regarded by M'FADYEAN as due to a severe infestation with lungworms.

II. During the previous two years a lung disease of sheep, almost certainly introduced into Iceland by the importation from Germany in 1933 of an affected yearling ram, spread rapidly and resulted in a mortality of 50-80% of the whole stock on many farms. The disease usually runs a chronic course, and the incubation period is 6-8 months or longer. The onset is insidious and the disease is not easily recognized in the early stages. The symptoms commence with an occasional cough, followed by respiratory distress on exertion, the presence of moist râles, especially in the inferior parts of the lungs, and an enormous increase in bronchial secretion. Sudden death may occur when the animals are subjected to muscular exertion, or secondary infections may supervene. Recovery is extremely rare.

The pathological changes are confined to the lungs, which are enlarged and studded with firm greyish nodules, irregular in shape and varying in diameter from 1 to 10 mm. The lesions are quite easily distinguished from those produced by *Muellerius capillaris*. Histologically, the affected areas resemble adenomata, and correspond to the descriptions of jaagsiekte, to "verminous pneumonia" [M'FADYEAN, (1888). *J. comp. Path.* **1**. 139.] and, to a certain extent, to COWDRY's "progressive pneumonia of sheep" [(1925-1926). *J. exp. Med.* **42**. 323 and 335, and **44**. 571].

Attempts to identify bacteria, protozoa, and viruses which might be responsible for the condition have failed. Certain strains of sheep are particularly susceptible. Transmission of the disease from infected to healthy animals is especially common when they are housed together; infection appears rarely to be contracted when the animals are at pasture.

It is claimed that intrapulmonary injection into three lambs of an emulsion of typical lesions was successful in reproducing the disease in one of the animals.

The wide-spread occurrence in Iceland of worm infestation in the absence of adenomatosis is considered to prove that these parasites are not the aetiological agent. Experimental infection of two sheep at Weybridge with larvae of *M.c.* sent from Iceland failed to produce adenomatous lesions in the lungs, although typical worm nodules were found at autopsy.

III. The literature dealing with jaagsiekte and progressive pneumonia of sheep is reviewed, with particular reference to the histological features of these conditions. It is stated that the conditions described by the author in 1894 and 1920 were undoubtedly jaagsiekte. The lesions are considered to represent "inflammatory new growths" which render the respiratory epithelium functionless: a virus is suggested as the most probable cause.—E. G. WHITE.

SPANU, P. (1938). Ereditatea "brahignatismului inferior" la cal. [**Inheritance of Inferior Brachygnathism in the Horse**].—*Rev. Med. vet., Bucuresti*. 50. 141-157. 4 figs. [8 refs.] [Abst. from German summary].

S. examined the horses of two pedigree strains and observed overshot jaw in four out of 713 (0.56%) in the one strain, and in six out of 1,403 (0.42%) in the other, in otherwise normal foals. An affected stallion of the first strain, when mated with normal mares, sired two affected and 63 normal foals. S. noted that when brachygnathism was the only malformation it was sex-linked, but that complex malformations occurred in which brachygnathism was part of the deformity, and that in these cases the condition was not sex-linked, but had a recessive hereditary factor. He will undertake further breeding experiments, by mating an affected mare with a normal stallion, and an affected stallion with a normal mare.

NEWSOM, I. E. (1938). **Urinary Calculi with Special Reference to Cattle and Sheep**.—*J. Amer. vet. med. Ass.* 92. 495-502. [16 refs.]

Urinary calculi in cattle and sheep appear to be more prevalent during the winter, when the animals are receiving a diet mainly composed of roughage and likely to be deficient in vitamin A and to have a high phosphate content. It is said that any change of diet very often prevents the appearance of further cases.

—J. A. NICHOLSON.

SCHIRRMESTER, E. (1938). Ein Beitrag zu Uebertragbarkeit der Geflügelleukose. [**Transmissibility of Avian Leucosis**].—*Berl. tierärztl. Wschr.* Feb. 11th. 81. [10 refs.]

Material from a tumour causing death in a turkey was injected into a rabbit, a g. pig and a chicken. The rabbit developed a leucocytosis and lymphocytosis after a week, the blood picture returning to normal two weeks later, and died of intercurrent disease four weeks after injection. The g. pig showed similar changes in the blood picture and was killed three months after injection. Neither animal showed any sign of leucosis at autopsy. In the chicken there was a leucocytosis and lymphocytosis which appeared for a time at intervals of a fortnight. The bird was killed and a tumour the size of a plum was found at the site of inoculation.

—SASSENHOFF (MUNICH).

DES LIGNERIS, M. (1938). **Fowl Sarcomata and the Tumour Problem**.—*S. Afr. med. J.* 12. 67-70.

The transmission of the cottontail rabbit papilloma by cell-free filtrates has shown that at least one mammalian tumour could be transmitted in this way, as is the case with the fowl tumours. The author found that he could test the

neutralizing power of antisera against tumour filtrates accurately. Heating the serum at 56°C. for half an hour did not affect its inhibitory qualities, but heating for two hours diminished them. The inhibitory action of immune sera could not be shown *in vitro* when it was tested on actual tumour cells. The author is inclined to the view that cancer is ultimately a disease of intrinsic origin, the malignant change originating in the diseased cell.—E. M. ROBINSON.

JACKSON, C. (1936). **The Incidence and Pathology of Tumours of Domesticated Animals in South Africa: A Study of the Onderstepoort Collection of Neoplasms with Special Reference to their Histopathology.**—*Onderstepoort J. vet. Sci.* 6. No. 1. pp. 460. 187 figs. [250 refs.]

J. studied approximately 600 neoplasms encountered in South Africa among domesticated species, including fowls, and devoted special attention to the detailed histology and cytology and to problems of diagnosis, classification, and nomenclature.

Dealing with the more general features of neoplastic pathology, he made extensive observations on the nucleolar:nuclear ratios in the cells of various tumours, and found this ratio of great value in the assessment of malignancy. A rapid technique for the estimation of the n:N ratio is described. Evidence is presented in favour of the nucleolar origin of certain hyaline intranuclear "inclusion bodies" which were encountered in a variety of tumours. He believes that in certain avian tumours collagen may develop intracellularly, and discusses the bearing of this phenomenon on the theory of collagen formation in general.

The Onderstepoort collection contains examples of the following neoplasms not previously recorded for the species mentioned:—carcinoma of the small intestine and carcinoma of the pancreas in the sheep; thymoma in the goat; embryonal nephroma in the horse; gliomata of the brain in the fowl; heart-base tumours in the dog which are considered probably to be sympathogoniomata (neuroblastomata); multiple reticulo-endothelioma of the liver and spleen in the sheep; myolipoma of the vagina of the bitch, and fibro-adenoma of the mammary gland in a male dog. Examples of tumours of rare occurrence include gland-cell carcinoma of the stomach in the horse, mammary carcinoma of the mule, cholangio-cellular carcinomata of the liver of bovines, hepatocellular carcinoma of the liver of the fowl, lymphangiomas of the subcutis of the mule and of the pleura of the horse, lymphangiogenous endothelioma of the peritoneum of the ox, and mesothelioma of the pericardium in the horse and of the peritoneum in bovines. The occurrence is recorded in fowls (on the tarso-metatarsus) and in sheep (on the scalp) of a type of epithelioma which combines the excessive keratinization of cornu cutaneum with the invasive growth of acanthoma.

The significance, diagnosis, and classification of certain cutaneous and apparently contagious tumours occurring very frequently among equines in South Africa are discussed. From histological and histogenetic study, as well as from clinical considerations, it is thought that these represent a one-sided development of lesions which in other species (dog and calf) constitute contagious papillomatosis. In early stages the lesions resembled papillomata, later the fibroblastic gained the ascendancy over the epithelial proliferation and the lesion ulcerated. It is proposed to designate these lesions as equine sarcoids.

An important feature of the work is the new light which is thrown on the vexed question of the nature of the contagious venereal tumour (so-called transmissible lymphosarcoma) of dogs. Attention is drawn to the frequency with which these tumours occur at superficial sites remote from the genitalia; but it is concluded that it is wrong to assign to these extragenital tumours a "spontaneous" origin,

there being evidence that the tumour may be transmitted by methods other than coitus, *e.g.*, by biting. J. believes that all cases of the disease arise through inoculation of cells derived from a pre-existing tumour of another individual. However, it is necessary to postulate that at some time in the past a spontaneous tumour arose, from the cells of which all subsequent tumours are directly descended. That such spontaneous tumours do occur in dogs is shown by the histological and cytological identity of certain primary neoplasms of the heart-base with the contagious tumours. The situation and cytology of these heart-base tumours favours their interpretation as neuroblastomata (sympathogoniomata) arising from the sympathetic ganglion which occurs in the posterior angle between the roots of the aorta and the pulmonary artery. Thus the contagious tumour is not a lymphosarcoma, but probably is a neuroblastoma.

Special chapters are devoted to:—epitheliomata; carcinomata with special reference to carcinoma in fowls; primary epithelial tumours of the liver; mesothelioma; connective-tissue tumours with special reference to the nature of the so-called mixed-cell sarcoma of fowls (histiocytic sarcoma); endothelial tumours with special reference to nomenclature, and the mixed neoplasms with special reference to their pathogenesis and classification. In all cases pains are taken to provide very detailed cytological descriptions with a view to extending, refining, and clarifying our diagnostic criteria.

In two appendices are summarized the species and organ incidence of animal tumours in South Africa, in so far as they are reflected in specimens submitted for examination over a period of fifteen years; a third appendix provides a systematic catalogue and guide to the Onderstepoort collection. Features of the figures are the high incidence of equine sarcoids (37% of equine specimens), thymoma of ruminants (4% of bovine and 5% of ovine tumour specimens), gland-cell carcinoma of sheep (28%, exceeding acanthoma by 3%), and basal-cell epithelioma of the dog (11%).

## NUTRITION IN RELATION TO DISEASE

GROENEWALD, J. W. (1937). **Animal Feeding in Relation to Diseases. I. Food Requirements of the Animal Body. II. Some Common Nutrition Debilities.**—*Fmg S. Afr.* **12**. 316-318 and 365-368. 3 figs.

I. A brief review of food constituents and minerals which are of importance in nutrition.

II. This is a general discussion on common nutritional debilities. Among the conditions dealt with under faulty feeding is winter cholera, in which severe diarrhoea or enteritis develops in animals kept on dry winter feed, with limited exercise over a considerable period, and then turned on to succulent pasture. Some harmful feeds are discussed, such as mouldy maize, prickly pear, ergot, and fodder containing cyanogenetic glucosides. The article goes on to consider the influence of diet on animal products, the preparation of feeds and feeding during fever, and other similar questions.—E. M. ROBINSON.

SMITH, W. K. (1938). **Failure of Alfalfa to Prevent the Hemorrhagic Sweetclover Disease.**—*Science*. **87**. 419. [5 refs.]

Poorly cured sweet clover hay may induce in bovines a disease characterized by a diminished clotting power of the blood, which appears to be due to a deficiency in prothrombin. Continued administration of the toxic diet results in severe, usually fatal, haemorrhage. Reference is made in this note to the studies of QUICK

[*V. B.* 8. 471.], who suggests that alfalfa meal contains a factor, possibly vitamin K, which prevents the development of the disease in rabbits. S., however, states that he has found no indication that alfalfa exerts a protective action against sweet clover disease.—N. J. SCORGIE.

MELLANBY, E. (1938). **Nerve Degeneration and Bone Hypertrophy Induced in Young Animals by Diet.**—*J. Physiol.* 93. 42P-43P. [5 refs.]

A short note on the relationship between degeneration of the eighth cranial nerve and bone overgrowth in the labyrinthine capsule of the ear of puppies fed on diets deficient in vitamin A. It is suggested that the bone overgrowth causes pressure on and stretching of the nerve, which results in the degeneration of the latter. Examination of the skull shows other bone abnormalities and bone overgrowth at the various foramina. The question remains to be decided whether all nerve degenerations produced on a vitamin A-deficient diet are due to bone overgrowth and the consequent pressure and stretching of the nerves.—N. J. S.

ELVEHJEM, C. A., MADDEN, R. J., STRONG, F. M., & WOOLLEY, D. W. (1937). **Relation of Nicotinic Acid and Nicotinic Acid Amide to Canine Black Tongue. [Correspondence].**—*J. Amer. chem. Soc.* 59. 1767-1768. [See also *V. B.* 9. 40].

During the progress of studies on the isolation of the antipellagra factor, two facts became evident. First, a commercial preparation of nicotinic acid proved highly effective in curing canine blacktongue. A single dose of 30 mg. gave a phenomenal response; the appetite improved immediately, the diarrhoea disappeared and the animal showed a growth response similar to that obtained on the original liver extract. Second, nicotinic acid amide, isolated from highly active concentrates by distillation and crystallization, also proved very active in the cure of the disease.—R. ALLCROFT.

I. ALMQUIST, H. J., & STOKSTAD, E. L. R. (1937). **The Gizzard Factor of the Chick.**—*J. Nutrit.* 13. 339-350. 1 fig., 4 tables. [12 refs.]

II. ALMQUIST, H. J. (1937). **Sources and Nature of the Chick Gizzard Factor.**—*Ibid.* 14. 241-245. 2 tables. [5 refs.]

I. In the course of experiments on haemorrhagic disease of chicks, gizzard erosions developed. These clearly had no aetiological connexion with the former because they were not curable by the same substances. In further work it appeared that the condition was not an avitaminosis, but that the preventive factor was easily destroyed by heat or by alcoholic potash, and readily absorbed by activated MgO from solution in hexane, and that it is present in fresh or dried greens and in wheat bran.

II. A's further experiments showed that the factor is present in the gizzard "lining" [? mucosa] itself, that it is fat soluble, and therefore cannot be identical with any member of the vitamin B complex, that it is unstable to heat and to ethyl alcohol, and that it has no noticeable effect on the growth rate of chicks.

ANSBACHER, S. (1938). **New Observations on the Vitamin K Deficiency of the Chick.**—*Science.* 88. 221. [3 refs.]

Vitamin K-deficient chicks, with the typical haemorrhagic diathesis, were fed 0.20 ml. of cod liver oil containing a vitamin K concentrate prepared from alfalfa. It was found that 1 mg. of the concentrate brought the blood-clotting time to normal in nearly all chicks within six hours, the effect lasting for 24 hours. The effect of 2 mg. lasted for more than 48 hours, that of 3.8 mg. for 72 hours.

Moreover, a relatively high amount of the concentrate reduced the clotting time to normal within  $2\frac{1}{2}$  hours.

A. claims that his observations offer a basis for a quantitative biological assay of vitamin K.

- I. McNAUGHT, K. J. (1938). **The Cobalt Content of North Island Pastures.** —*N.Z. J. Sci. Tech.* **20**. 14A-30A. 10 tables. [20 refs.]
- II. ASKEW, H. O., RIGG, T., & STANTON, D. J. (1938). **Cobaltized Superphosphate.** *Ibid.* 82A-89A. 3 tables. [4 refs.]
- III. ASKEW, H. O. (1938). **Effect of pH Value on Solubility of Cobalt Phosphate.** —*Ibid.* 106A-109A. 1 fig. 1 table. [3 refs.]
- IV. TAYLOR, C. R., & McNAUGHT, K. J. (1938). **Top-Dressing with Cobalt. Experiments in Bush-Sick Country.** —*N. Z. J. Agric.* **57**. 206-210. 2 tables, 3 charts. [1 ref.]
- V. MEIROSE, G. B., & McNAUGHT, K. J. (1938). **Top-Dressing with Cobalt. Arohana Experiment.** —*Ibid.* 211-212. 2 figs, 1 table. [1 ref.]

I. This is another valuable chapter in the story of the part played by cobalt in animal nutrition. The author has evolved a method by which quantities of cobalt down to 0.00005 mg. or even lower can be measured, a great improvement on the unit of 0.01 mg., which was the smallest quantity that could be measured previously, by the best method available in 1933. A cobalt survey was made of pastures from widely separated areas in the North Island of New Zealand and the cobalt content correlated with the health of ruminants grazing on them. Pastures containing less than 0.04 p.p.m. cobalt on a dry matter basis induce "bush-sickness" in both sheep and cattle. Above 0.04 p.p.m., pastures are generally "sound" for cattle, and above 0.1 p.p.m. they are "sound" for sheep. Between 0.1 and 0.04 p.p.m. pastures may be either "sound" or "unsound" for sheep. [Unfortunately, a fairly large proportion of samples lie within this zone]. The author suggests 0.07 p.p.m. as the boundary between pastures "sound" and "unsound" for sheep, but the division is not a sharp one. This is due probably to the inaccuracies inherent in most pasture sampling methods.

II. The authors show that when 0.2% of cobalt is added to superphosphate, 80-90% of the cobalt is water soluble. When cobalt is added to other phosphatic manures its solubility depends on the pH value of the manure. Where the pH exceeds 6.0 the reduction in solubility is very marked.

III. It is shown that cobalt phosphate is readily soluble in aqueous solutions at pH 2.0, and that above pH 3.0 the solubility is closely correlated with the percentage of phosphate present as  $\text{H}_2\text{PO}_4$  ion.

IV & V. Three experiments are described in which cobalt-deficient pastures were top-dressed with  $\frac{1}{2}$ -2 lb. cobalt chloride per acre. In all three experiments both ewes and lambs grazing on cobalt-treated pastures thrive considerably better than controls [although very small, badly-matched groups of ewes were used]. The cobalt content of treated pastures remained above 0.1 p.p.m. for five months. Top-dressing with limonite gave intermediate results, but on account of the large amount necessary the use of this material is relatively uneconomical.

—J. F. FILMER.

- UNDERWOOD, E. J., & ELVEHJEM, C. A. (1938). **Is Cobalt of any Significance in the Treatment of Milk Anemia with Iron and Copper?** —*J. biol. Chem.* **124**. 419-424. 1 table. [9 refs.]

Anaemic rats were divided into three groups, one receiving milk *ad lib.* plus a daily addition of 0.05 mg. Cu, 0.02 mg. Mn, and 0.5 mg. Fe (Co-free), the second

a similar diet except that the iron was not freed from Co, and the third group the same diet as the first with addition of 0.1 mg. Co. There were no significant differences between the groups in respect of growth or of haemoglobin regeneration, and though the daily milk contained an average of 0.6 $\gamma$  Co it is concluded that the small amounts of Co contaminating iron salts play no significant part in the treatment of milk anaemia in the rat. The possible Co requirement of the rat is discussed, and from the present data appears to be less than 0.6 $\gamma$  Co. —ALFRED EDEN.

## PUBLIC HEALTH

THOMAS, S. B., & HOBSON, Phyllis M. (1938). **The Routine Bacteriological Examination of Accredited Milk.**—*Welsh J. Agric.* **14**. 247-260. 12 tables. [14 refs.]

The rapid increase in the production of Accredited Milk in Wales since 1935 is discussed and explained, and the methods of sampling and examining such milk for bacterial standard are dealt with in detail. The importance of careful sterilization of dairy utensils is illustrated and it is noted that in those counties where steam-sterilization of utensils is compulsory the percentage of samples falling below standard is only half that of samples from counties where it is voluntary.

A critical comparison is made of the methylene blue test, the coliform test and the plate count as indicators of the bacterial standard of milk samples. It is concluded that the methylene blue test, augmented by the coliform test, constitutes a reasonably accurate means of assessing the bacterial standard of samples of Accredited Milk.

It is noted that samples fall below the bacterial standard chiefly in summer, and more especially in August, due probably to inefficient cooling immediately after production, and to inefficient sterilization of utensils. Bacterial standards are suggested for milks of grades higher than that of Accredited Milk examined by methylene blue and coliform tests. The influence of appropriate education of the producer upon the quality of milk from his farm is illustrated. —H. BURROW.

BOURGEOIS, G. (1938). **Le contrôle hygiénique du lait à Dijon.** [*Milk Control in Dijon*].—*Lait*. **18**. 648-666.

This is an account of past conditions relating to milk production and distribution in the city of Dijon. The improvements which have gradually been brought about, mainly by the periodical introduction of municipal laws, are traced up to date. In 1938 a further set of regulations was issued, but B. concludes with an indication that there is still progress to be made. A copy of the municipal control laws governing milk production and distribution in Dijon is appended. —H. E. B.

DAVIS, D. J. (1938). **Public Health Aspects of Mastitis.**—*J. Amer. vet. med. Ass.* **93**. 19-20.

A general statement of the position, with no new information. —H. BURROW.

- I. GILCREAS, F. W., & DAVIS, W. S. (1937). **The Practical Value of the Phosphatase Test in Determining the Efficiency of Pasteurization.**—*Proc. int. Ass. Milk Dirs.* 1937. pp. 34-56. 11 tables, 2 diagrams. [7 refs.]
- II. VON DOHLEN TIEDEMAN, W., & HOHL, N. J. (1938). **Improved Laboratory Control of Pasteurized Milk.**—*Amer. J. publ. Hlth.* **28**. 629-632. [10 refs.]
- III. FUCHS, A. W. (1938). **Contamination of Pasteurized Milk by Improper Relative Pressures in Regenerators.**—*Publ. Hlth Rep., Wash.* **53**. 496-505. 6 figs.

- IV. SLANETZ, L. W. (1938). **Prevalence and Classification of Hemolytic Streptococci in Pasteurized Milk.** *Tech. Bull. N.H. agric. Exp. Sta.* No. 70. pp. 12. 1 fig., 2 tables. [16 refs.]
- V. SAVAGE, W. (1938). **Milk and Pasteurization.**—*J. R. sanit. Inst.* 59. 1-11. 1 table. [10 refs.]
- VI. MACGREGOR, A. S. M. (1938). **The Milk Supply.**—*Edinb. med. J.* 45. 363-367.

I. This paper provides further evidence of the sensitivity and reliability of the phosphatase test for detecting inefficient pasteurization. Variations in the temperature employed, variations of five minutes or longer in the heating time, and the addition of 0.1% or more of raw milk are readily detectable. Many interesting observations on the carrying out of the test are also made.

II. Standard plate counts are considered useless for the laboratory control of pasteurized milk. The best index of the safety and cleanliness of such milk is to be obtained by subjecting surprise samples to:—(a) the phosphatase test to determine proper pasteurization; (b) the coliform test to determine possible contamination after pasteurization, and (c) a direct microscopic count as an indicator of the presence of thermophilic bacteria and contamination after pasteurization.

III. In pasteurization embodying the milk to milk, or milk to water to milk principles of preliminary heating of raw milk by hot milk just after it has been heat-treated, flaws in the piping or joints may lead to contamination of heated by raw milk. To prevent this it is necessary for the raw milk to be pumped at a lower pressure than the heated milk. Methods are described to enable officials to determine whether the required relative pressures are being used.

IV. It is shown that the weakly haemolytic streptococci so prevalent in pasteurized milk enter the milk at the farm from utensils inefficiently cleaned and sterilized. None were present in milk samples taken aseptically from cows. Samples of raw milk from ten of the 15 farms studied revealed these streptococci. They are particularly heat-resistant, and resist pasteurization temperatures.

Sixty strains of these streptococci were examined. They produce *alpha* prime type colonies on blood agar, and are classified as *Str. bovis* var. A, B, C, or D or as *Str. faecalis*. None of the organisms isolated reacted with any of Lancefield's sera.

V. The provision of a cheap, clean, and safe milk supply is essential, and as much in the interests of the producers as of the public. S. states that he has no bias in favour of pasteurization if these aims can be achieved in any other way. Existing measures involving designated standards of milk, routine clinical veterinary inspection, and the sampling of milk, although desirable, can, he asserts, never make the ordinary milk supply safe. Pasteurization on the other hand, when efficiently carried out, destroys all the pathogenic organisms which may spread disease from milk, leads to no significant change in its nutritive value, and is also a practical proposition.

VI. M. contends that, in large centres of population, it is an unsound plan to exempt from compulsory pasteurization the milk from T.T. herds. His reasons are that the risk of transmitting disease by bulk milk is too great, and that milk from T.T. herds is only safe as regards tuberculosis infection. Finally, it is difficult to keep even safe milk wholesome, particularly during the summer months when it has to be conveyed long distances. GWILYM O. DAVIES.

BLANCHARD, C. K. (1937). **Septic Sore Throat—Another Reason for Pasteurization.**—*Publ. Hlth News, Trenton, N. J.* 21. 3-8. [Copied verbatim from *Bull. Hyg., Lond.* 13. 224-225. Signed C. R. JONES].

A survey of milk-borne epidemics in New Jersey during the last 27 years

shows that in this period, there was 58 outbreaks, in which contaminated milk was the vector of infection and in all but one the milk was raw. Three recent outbreaks of septic sore throat have occurred in communities where raw milk is still used, and since this disease was not spread by milk until three years ago, it seems that these outbreaks give further evidence for requiring universal pasteurization.

The first outbreak occurred in 1933 and within 30 days from the first recognized case, there were 131 typical cases with two deaths in a town of 2,700. Study revealed that 82 per cent. of these cases were users of a local supply of raw milk. The other cases were presumably contact cases.

Six of the 16 cows producing this supply of milk had infected udders. Pus and streptococci were found in the fore milk. A milker at this dairy had had septic sore throat shortly before epidemic. It may be supposed that he had infected the cows.

A year later a second outbreak in this same community was traced to another dairy supplying raw milk. In both cases the epidemics abruptly terminated when pasteurization was required.

A third outbreak, involving one hundred and seventy-five persons with seven deaths was immediately traced to the raw milk supply used. In this case there was a milk supply of 450 quarts used per day. One third of this supply was pasteurized while the remaining two thirds was delivered raw. The victims of the epidemic cited were among the consumers of the raw milk. Not one consumer of the pasteurized portion of the milk supply contracted the disease. When the entire portion of the supply was pasteurized the epidemic ceased.

PULLINGER, E. J., & KEMP, Audrey E. (1938). **Growth of *Salmonella typhi* and certain other Members of the *Salmonella* Group in Milk and Butter Stored at Atmospheric Temperatures.**—*J. Hyg., Camb.* 38. 587-595. 6 tables, 1 diagram. [8 refs.]

The question whether certain members of the genus *Salmonella* can multiply in milk and butter stored at atmospheric temperatures was studied. *S.t.*, *S. paratyphi* A, *S. paratyphi* B, *S. cholerae-suis*, *S. typhi-murium*, var. *dublin*, and *S. bovis morbillicans* were examined, as these species have been associated with milk-borne epidemics. They all multiplied readily even at 15°C., and from this it is concluded that, whether the primary contamination of milk arises from the cow as with *S.t.-m.*, var. *dublin*, or from a human carrier as with *S.t.*, the important factor in the development of an epidemic is the ability of these organisms to multiply during storage. These organisms did not multiply in butter similarly stored, and actually died out gradually, but viable organisms were present for many weeks.

HENNING, M. W. (1938). **Calf's Meat as a Cause of Paratyphoid in Natives.**—*S. Afr. med. j.* 12. 55-56. 1 table. [9 refs.]

Attention is drawn to an outbreak of acute food poisoning in ten natives who had eaten the flesh of a calf with paratyphoid infection. *Salmonella enteritidis* var. *dublin* was isolated from the blood of one native who died. In spite of the wide distribution of calf paratyphoid in South Africa, food poisoning outbreaks as a result of eating the flesh of infected calves are rare. —E. M. ROBINSON.

LAWRENCE, W. A. (1938). **One Hundred Per Cent Meat Inspection.**—*J. Amer. vet. med. Ass.* 92. 527-531.

\* The federal meat inspection service exercises control only over meat intended for inter-state trade, viz, about 65% of the meat and meat products consumed in

the U.S.A. Of the remaining 35% haphazard inspections are generally made of 5% by veterinarians, and of 8% by lay inspectors under veterinary supervision, and the rest is not inspected at all. In one State 95% of the meat intended for consumption within that state is not examined. Only one State maintains an efficient systematic meat inspection service.

The desirability of establishing an efficient service to cover all meat and meat products and the measures to bring this into effect are discussed. —H. E. BYWATER.

ZEETTI, R. (1937). Ricerche batteriologiche sulla putrefazione della carne. [**Bacteriological Observations on the Putrefaction of Meat**].—*G. Batt. Immun.* **19**. 141-170. 11 figs. [Numerous refs.] [English summary]. [Copied *verbatim* from *Bull. Hyg., Lond.* **13**. 139. Signed G. S. WILSON]

Samples of meat from cattle were taken at the slaughterhouse, brought to the laboratory, and incubated under aerobic or anaerobic conditions at temperatures between 0° and 60°C. usually 18°-22°C. Bacteriological examinations were made at intervals, the types of organisms present were studied, and the rate at which putrefaction advanced was measured. As might be expected, numerous different organisms were found, and there was a tendency for different sets of organisms to be associated with different stages of putrefaction. Observations showed that the bacterial invasion of the meat occurred along the connective tissue between the muscle bundles; the muscle fibres themselves were not invaded till later.

MINETT, F. C. (1938). **Experiments on Staphylococcus Food Poisoning.**—*J. Hyg., Camb.* **38**. 623-637. 2 tables.

The importance of staphylococci as a cause of food poisoning in man is now clearly established, the poisoning being due to the formation in the food of a product which for convenience may be referred to as enterotoxin. For demonstrating this product, feeding tests on monkeys (*Macacus rhesus*) have been recommended, but M., in common with some other authors, has shown that these animals are unsatisfactory owing to their variable susceptibility, and the same is true of dogs and cats. DOLMAN [p. 63.] found that kittens were highly susceptible to enterotoxin; these animals react with symptoms of vomiting and diarrhoea after intraperitoneal injection of the product. This was confirmed by M. in the course of work involving the use of more than 300 kittens. Enterotoxin was formed by: (a) 16 out of 38 strains of *Staph. aureus*, isolated from cases of acute or chronic mastitis or from normal udder milk, and (b) four out of five strains of *Bacterium coli*, mostly from calves with "white scours". No enterotoxin was obtained from 15 strains of *Streptococcus agalactiae* from mastitis in cows.

The formation of enterotoxin under natural conditions was observed:—

(a) In udder milk seeded with *Staph. aureus* or naturally contaminated with that organism and stored at atmospheric temperatures (18° and 22°C.); under these conditions enterotoxin formation is associated with a vast increase in the number of staphylococci and sometimes with the development of a "malty" flavour in the milk. The substance remains active in cheese prepared from such milk.

(b) In layer cake made with cream naturally contaminated with *Staph. aureus*.

A small outbreak of poisoning due to potted meat paste was shown to be caused by a non-haemolytic staphylococcus.

A few feeding experiments on human beings with milk or cream in which food-poisoning staphylococci had grown were negative, but on one occasion a staphylococcus from a case of mastitis yielded a culture filtrate which caused symptoms of food poisoning in a human volunteer.

Enterotoxin has the following properties:—It is resistant to heat (95°C. for 30 minutes), to low concentrations of formalin sufficient to destroy the haemolytic toxin, to acid (pH 5.0) and to rennet, but is destroyed by trypsin. It diffuses freely into the culture medium, but only slightly through collodion. It is antigenic. Its properties are such that enterotoxin can be classed as a bacterial exotoxin.

## THERAPEUTICS

ANON. (1938). **Chemotherapy of Meningitis.**—*Lancet*. **234**. 733-734. [7 refs.]

Much success has resulted from the use of sulphanilamide in the treatment of streptococcal meningitis in man. An adequate concentration in the blood as early as possible is essential, maintained by repetition at four-hourly intervals until improvement occurs. Intrathecal administration has also been recommended. Further knowledge is required on the rapidity and extent of the passage of sulphanilamide into the cerebrospinal fluid. —ALFRED EDEN.

GETZ, H. R. (1938). **Cod Liver Oil Therapy in Experimental Tuberculosis.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 543-545. 1 fig. [4 refs.]

The work recorded here shows that cod liver oil promotes healing of tuberculous ulcers in the skin of g. pigs, whether applied locally or given by intramuscular or subcutaneous injection.

It is also shown that the healing factor is contained in the vitamin fraction, and that it is not vitamin A or vitamin D. W. J. IRONSIDE.

I. LEVADITI, C., & REINIÉ, L. (1938). Chimiothérapie de l'infection déterminée chez la souris et la poule par la *Pasteurella avicida*. [**The Chemotherapy of *Past. aviseptica* Infection**].—*C. R. Soc. Biol. Paris*. **127**. 1179-1180. 1 table. [1 ref.]

II. LEVADITI, C., & VAISMAN, A. (1938). Chimiothérapie antiendotoxique. Endotoxine de la *Pasteurella avicida* [**The Endotoxin of *Past. aviseptica***].—*Ibid.* **128**. 283-285.

I. The authors describe the therapeutic effect of oral administration of five benzene-sulphur derivatives on 90 mice and 23 fowls inoculated with lethal doses of live *Past. aviseptica*. In their opinion, all five derivatives possess a certain degree of therapeutic activity, which is, however, very slight compared with that exerted in streptococcal infections.

II. Several series of ten mice were injected (intraperit.) with 2.5 mg. of the endotoxin of *Past. aviseptica*, and adequate doses of benzene-sulphur derivatives were simultaneously administered *per os*. The authors found that p-aminophenylsulphamide possessed anti-endotoxic properties *in vivo*, and that surviving mice were refractory to intraperitoneal injection of live bacilli.—R. O. MUIR.

PIGOURY, L. (1938). Reviviscence de lésions cutanées ou ecthyma stibié au cours du traitement de la leishmaniose canine par les antimoniaux. [**Reappearance of Cutaneous Lesions during Antimony Treatment of Canine Leishmaniasis**].—*C. R. Soc. Biol. Paris*. **127**. 105-108. [4 refs.]

Two "clean" dogs were injected (intramusc.) every 2nd day with 1-3 c.c. of a solution of lithium antimonio-thiomalate. In both, a pustular dermatitis developed along the abdomen and inside the thighs after the ninth injection. The cutaneous pustules healed within a week, while injections were being continued. P. deduces from these results that the transitory reappearance of lesions in dogs, during

treatment for general leishmaniasis by antimony therapy, is a sign of antimony intoxication, not a spontaneous symptom of the disease.—R. O. MUIR.

JAKIMOV, V. L., [YAKIMOFF, W. L.] & RASTEGAIEVA, E. F. [RASTEGAIEFF, E. F.] (1987). K voprosu o lečenii kokcidioza krolikov. [**Treatment of Coccidiosis in Rabbits**].—*Sborn. Rab. Leningrad. vet. Inst. 1937*. pp. 145-154. 2 tables. [German summary].

The following were tested for their efficacy in the treatment of coccidiosis in rabbits:—silver compounds—ichthargan, argochrom, albargin, protargol, argo-flavin, lyargol, "silbernovoarsolan"; bismuth compounds—"bismuthoqui", "byechinol" and "birathyl"; alkaloids—enchinin and aristochin; anthelmintics—"distol", "serapis", "neoserapis", filmaron, "igitol" and "Dr. Sprehn's capsules", and various other substances ("coccidol", urotropine, tanningen, "ventrase", "adsorgan", and whey).

Good results were obtained with the following, given in order of efficacy:—albargin, ichthargan, ichthargan with methylene blue (this, however, caused great loss of weight, and two deaths from exhaustion), all the other silver compounds, and chinosol, "cresolin", and methylene blue, the three latter having been tested in a previous experiment. The other substances tested gave negative results.

LEGG, J. (1936). **The Treatment of Piroplasmosis (P. Bigeminum) with Akiron**.—*Aust. vet. J.* **12**. 227-230. [5 refs.]

L. inoculated two non-splenectomized bulls and three splenectomized steers with *Babesia bigemina*. When the animals showed an acute reaction they were inoculated intravenously with 4.5 or 5 ml. of a 5% solution of akiron. This resulted in a rapid reduction of the number of parasites, a fall in temperature, and recovery. The three splenectomized animals were later inoculated with 5 ml. of citrated blood containing *B.b.*; two of them required therapeutic treatment, and piroblue was given. The doses of akiron used had caused complete destruction of the blood parasites, so that no premunition resulted.—T. S. GREGORY.

- I. CRAUFURD-BENSON, H. J. (1938). **An Improved Method for Testing Liquid Contact Insecticides in the Laboratory**.—*Bull. ent. Res.* **29**. 41-56. 7 figs., 14 tables. [15 refs.]
- II. MCGOVAN, E. R., & ELLISOR, L. O. (1936). **Repellency of Pine-Tar Oil to Wound-Infesting Blowflies**.—*J. econ. Ent.* **29**. 980-983. [2 refs.]
- III. MCGOVAN, E. R. (1937). **Insecticides to Control Blowfly Larvae in Wounds**.—*Ibid.* **30**. 876-879. [5 refs.]

I. The method consists essentially in the immersion of insects in insecticide solutions, and the technique is fully described. It is shown that any variation in technique gives variation in results and suggested that by strict observance of the technique described, identical results may be obtained by different workers.

II. Pine tar oil (S.G.1065) was applied to wounds in sheep and goats at intervals of 1-5 days. Daily application was found to be definitely the most effective method.

III. Agents found to be effective were methyl thiocyanate in 2% solution in soluble pine tar oil, nicotine 95% in 2% solution in soluble pine tar oil, and benzol. Treatment consisted in filling the wounds with the solutions and of holding the animals for about 35 seconds. In the case of benzol the opening of the wound was plugged.—W. J. IRNSIDE.

KRAFT, E. (1937). Beitrag zur Bekämpfung der Wurmkrankheiten der Pferde. [**Control of Worms in Horses**].—*Dtsch. tierärztl. Wschr.* 45. 641-648.

A record of trials of two new anthelmintics, "strongylon" (organic arsenic preparation) and "Ciff capsules" (containing  $\text{CCl}_4$ , arsenious acid and an anthraquinone purgative), both prepared by A.G. Farbenindustrie. Ninety-three horses infested with strongyles were treated with "strongylon", and 50 infested with strongyles and ascarids were given "strongylon" followed by "Ciff capsules". The former was very effective against strongyles only, and ascarids were killed by "Ciff capsules".—J. E.

DAVIS, H. P., & HATHAWAY, I. L. (1936). **The Effect of Sprouted Oats in Reproduction of Dairy Cattle**.—*J. Dairy Sci.* 19. 439-440.

In view of the suggestion that delayed pregnancy in cattle is due to a vitamin deficiency, observations were carried out, with suitable controls, on groups of cattle of various breeds, sprouted oats having been added to their daily ration.

The authors found that such oats had no marked effect upon the reproductive function of heifers, cows or bulls as measured by the number of services required for conception.—H. V. HUGHES.

BARDENS, G. W. (1938). **Treatment of Infectious Keratitis with Mercurochrome**.—*J. Amer. vet. med. Ass.* 93. 85-86. [5 refs.]

Excellent results are recorded in the treatment of this condition in cattle with "keratitis mixed bacterins" [a commercial vaccine, the composition of which is not given] assisted by local applications of mercurochrome.—D. D. OGILVIE.

FORBES, J. C. (1938). **Studies on the Prevention of Liver Cirrhosis by the Subcutaneous Injection of a Liver Preparation**.—*J. biol. Chem.* 123. xxxvii-xxxviii. [2 refs.]

F. describes experiments carried out to determine whether a liver preparation would protect rats against liver cirrhosis due to chronic carbon tetrachloride poisoning. He found that if 100 mg. per 100 g. body weight of the preparation was injected subcutaneously 18-24 hours before each poisoning, there was no severe liver damage, although marked cirrhosis was observed in the livers of the controls. Doses of 50 mg. per 100 g. body weight did not prevent moderate cirrhosis, but the more severely damaged livers of the controls indicated that even this dose afforded some protection.

I. STRONG, L. C. (1938). **The Liquefaction of Spontaneous Tumors of the Mammary Gland in Mice by Heptyl Aldehyde**.—*Science.* 87. 144-145. [3 refs.]

II. STRONG, L. C., & WHITNEY, L. F. (1938). **The Treatment of Spontaneous Tumors in Dogs by the Injection of Heptyl Aldehyde**.—*Ibid.* 88. 111-112. [1 ref.]

I. Twenty-five mice with spontaneous mammary tumours were placed on a diet containing heptyl aldehyde [no details of dosage] and in all of them liquefaction of the tumours occurred, leading to complete regression in six cases. The tumours of 120 control cases did not change.

II. The authors applied the principle mentioned above to ten dogs with benign tumours, by injecting heptyl aldehyde in doses of from 0.1 c.c. to 1 c.c. into and/or remote from the tumour. In every case the tumours softened, and in some cases they disappeared entirely, while at the same time the dogs improved remarkably in health, and increased in weight. [Mention is made of the draining

away of the fluid resulting from the softening process, but it is not stated whether this is necessary in every case]. The work is being continued.—J. E.

## POISONS AND POISONING

SEDDON, H. R. (1937). **Poison Plants in Australia.**—*J. comp. Path.* 50. 307-311.

The seriousness of losses due to poisonous plants in Australia is due to:—(1) the many species of toxic plants present in the natural vegetation, and (2) the extent to which stock are driven from one part of the country to another. The poison plants include:—(a) native plants, many of which are cyanogenetic, and (b) introduced plants: (c) includes cyanogenetic fodder plants (sorghum and sudan grass), accidentally introduced weeds which may lead to a form of staggers (which is accentuated by the common practice of droving), and introduced garden plants to which animals commonly gain access.—ALFRED EDEN.

STEYN, D. G. (1936). **Differential Diagnosis in Plant Poisoning.**—*J. S. Afr. vet. med. Ass.* 7. 226-237.

In this very comprehensive but condensed article a great deal of information is given on the differential diagnosis of plant poisoning in South Africa. The subject is discussed under the following headings:—(a) sudden deaths, (b) pathognomonic symptoms, and (c) toxic agents and diseases with similar symptoms.

—E. M. ROBINSON.

RIMINGTON, C., & ROETS, G. C. S. (1937). **Chemical Investigation of the Plant *Acalypha indica*. Isolation of Triacetoneamine, a Cyanogenetic Glucoside and Quebrachite.**—*Onderstepoort J. vet. Sci.* 9. 193-201. 5 figs., 2 tables. [4 refs.]

The plant *A.i.* is cyanogenetic, containing approximately 270 mg. HCN per 100 g. dry weight of the dried, powdered material.

A base is present in extracts of the plant, being derived from some precursor—possibly the glucoside itself. This base has been identified as triacetoneamine, of which the picrate (M.P. 196°C.) and 2:4 dinitrophenylhydrazide have been prepared and described. Quebrachite, 1-inositol monomethyl ether, has also been isolated from the plant.

The cyanogenetic glucoside appears to crystallize in two forms, *viz.*, thin hexagonal plates (M.P. 182-4°C.) and fine silky needles (M.P. 108°C.). The molecular formula  $C_{14}H_{20}(22)N_2O_{10}$  is suggested. It yields basic material on hydrolysis. From an acid hydrolysate of the glucoside, tested with Brady's reagent, acetic acid 2:4 dinitrophenylhydrazide has been isolated. The possibility of the presence in the molecule of an N-acetyl group is indicated.

STEYN, D. G. (1937). **Experiments with Plants Alleged to be used as Abortifacients and Ecbolles by Natives.**—*Onderstepoort J. vet. Sci.* 9. 107-109. [2 refs.]

S. ascertained the effects of *Momordica foetida*, *Leonotis americana*, and *Abutilon indicum* upon rabbits in a state of advanced pregnancy. The results indicated that the plants were non-toxic to rabbits and not liable to cause abortion. It should, however, be mentioned that the experiments were of necessity conducted with dry, and not fresh, plant material.

## PHYSIOLOGY

VANLANDINGHAM, A. H., HENDERSON, H. O., & BOWLING, G. A. (1935-1936). **Studies on the Chemical Composition of the Blood of Dairy Cattle. I. The Effect of Age and Phosphorus Intake on the Calcium and Inorganic Phosphorus Content of Whole Blood of Dairy Heifers. II. The Effect of Phosphorus Intake upon the Calcium and Inorganic Phosphorus Content of Whole Blood of Dairy Heifers during the Period of First Gestation and Lactation.**—*J. Dairy. Sci.* **18**. 557-572, and **19**. 597-609. 3 figs., 8 tables. [Numerous refs.]

I. Three groups of growing heifers were fed on rations equal in content of total digestible nutrients including protein, one group receiving a normal ration and the others a low P ration. Composite blood samples were made monthly from each group and analysed for total Ca and inorganic P. Normal animals showed a slight increase in blood inorganic P from the second to the fourth month, a constant level until the tenth month, and thereafter a gradual decline with age. Low P rations led to an immediate lowering of blood inorganic P, preceding by several weeks the physical symptoms of P deficiency which include anorexia, stiffness in fore- and hind-quarters, and emaciation. The P requirements of growing animals depend largely upon the rate of skeletal growth, 3.8 g. P per 100 lb. live weight being adequate to maintain normal blood inorganic P up to 25 months of age, whilst one-third this quantity is insufficient. The Ca content of the blood was unaffected by age or by level of P intake.

II. Two groups of heifers were fed on rations equal in respect of total digestible nutrients in proportion to body weight, but respectively normal and low in P. Composite samples of whole blood were analysed periodically for inorganic P and Ca contents. There was a decided drop in the blood inorganic P at or just after parturition, more pronounced in the low P group. Milk production associated with low P intake also led to a lowering of the blood inorganic P. In the period of first gestation an average intake of 1.2 g. P per 100 lb. body weight was sufficient to maintain the inorganic P at the normal level, but during lactation heifers giving 2-3 gallons of milk daily required 0.9-1 g. P per 100 lb. live weight in the food above that in the milk to maintain the normal blood in organic P level. Gestation, lactation and lowered P intake had no appreciable effect on the whole blood Ca level.—ALFRED EDEN.

HAWKINS, W. B., & WHIPPLE, G. H. (1938). **The Life Cycle of the Red Blood Cell in the Dog.**—*Amer. J. Physiol.* **122**. 418-427. 2 tables, 4 charts [17 refs.]

A method is described for estimating the length of the life-cycle of the red blood cell in the dog. A dog having a bile fistula, and in its normal state of health, weight equilibrium, appetite and activity, is the subject of weekly, haemoglobin determinations and daily analyses of bile pigment elimination. Anaemia is produced by injection of acetyl phenyl hydrazine or by bleeding, and a mass of new red cells enters the circulation. The bile pigment output falls for several weeks, but later, as the new red cells become obsolete, the output rises. In four dogs the period elapsing between the mid-point in the curve of the time of most active haemoglobin regeneration and the time when bile pigment output was greatest (*i.e.*, the estimated length of the life-cycle of red blood cells) averaged 124 days. On the basis of the figures obtained, the estimated output of bile pigment averaged 83 mg. per day, and the actual observed output, 85 mg. per day.—H. V. HUGHES.

CORDIER, G., & MÉNAGER, J. (1938). La variabilité de la sédimentation des globules rouges chez les équidés. [**Variations in the Sedimentation Rate of Red Blood Cells in Equines**].—*Rec. Méd. vét.* 114. 97-104. [1 ref.]

With a view to assisting in the diagnosis of an enzootic of suspected equine infectious anaemia, observations were made upon the variations in the rate of sedimentation of red blood corpuscles in horses, donkeys and mules. The test did not prove of any value in diagnosis, and the authors consider that such tests and interpretations of observations upon them can only be accepted with considerable reserve. The rates of sedimentation in cases of equine influenza resembled the rates in cases of E.I.A. A difference of 1 or 2 mm. in the diameter of the test tubes had a considerable effect on the rate of sedimentation. Samples of blood from the two jugular veins, taken simultaneously, differed in the rate of sedimentation [see also *V. B.* 5. 555, and 8. 507 and 670].—H. V. HUGHES.

WARBRITTON, Virgene, MCKENZIE, F. F., BERLINER, V., & ANDREWS, F. N. (1937). **Sperm Survival in the Genital Tract of the Ewe**.—*Proc. Amer. Soc. Anim. Prod.* 1937. pp. 142-145. 1 table.

The authors killed 84 ewes which had been inseminated, artificially or naturally, approximately 2, 12, or 22 hours beforehand. Sections of the genital tracts were examined for pH of secretions and for number and normality of sperm present. In the fallopian tubes normal sperm were most numerous, on the average, in ewes which had been inseminated 12 hours previously. Abnormal sperm were relatively most numerous in ewes inseminated 2 hours previously and least numerous in those inseminated 22 hours previously.

The average number of abnormal sperm per thousand was 381 in the tubes and 277 in the uterine horns.

Sperm were best preserved and most constant in numbers in the cervix, which was usually the most acid section of the tract, though the pH was always within the range of normal semen. The vagina was usually the most alkaline section unless insemination had occurred 19-22 hours previously. Acidity in this region developed in relation to the disappearance of the sperm, and not in relation to the termination of oestrus.

The authors conclude that, of the three periods examined, 12 hours before ovulation is the most suitable time for insemination. For many ewes this would mean mating 10-18 hours after the beginning of oestrus.—J. G. MURRAY.

DODDS, E. C. (1937). **The Theoretical and Practical Significance of Endocrinology**.—*J. R. Inst. publ. Hlth Hyg.* 1. 135-153. [Numerous refs.]

D. gives an account of the action and, in some instances, the constitution of the hormones of the pituitary, the ovary, testis and suprarenal glands.

The results of experiments here described suggest that the posterior lobe of the pituitary is essential to digestion, producing a secretion which maintains the capillaries of the alimentary tract in a constant state of partial contraction, in which state they are able to dilate in response to a stimulus and thus bring about alimentary secretion.

He points out that hormones should not be regarded as substances which can be administered in the same manner as can single drugs. For example, in order to produce satisfactory results, the hormones oestriol and progesterone must be used together in a way which will imitate their natural production from the ripening Graafian follicle.—H. V. HUGHES.

PIERRE. (1938). Endocrinologie thyroïdienne. [**The Thyroid Gland and Its Disorders**].—*Rev. Méd. vét., Toulouse*. 90. 305-322.

A general account of the functions of the thyroid gland, including a discussion of the effects of hypo- and hyperthyroidism. No new work is referred to.  
—J. A. NICHOLSON.

VENZKE, W. G. (1938). **Endocrines and their Role in Reproduction**.—*J. Amer. vet. med. Ass.* 92. 663-680. [Numerous refs.]

A summary of the present knowledge on the control of reproduction by the endocrine substances, together with a short discussion of the possibility of extending the use of the latter in practice.—J. G. MURRAY.

SIMONNET, H. (1937-1938). Les hormones sexuelles. (I & II). [**Sex Hormones. I & II**].—*Rev. Path. comp.* 37. 1118-1132, and 38. 445-459. [Num. refs.]

I. The chemical structure of testosterone and other androgenic substances, of oestradiol and other oestrogenic substances, and of progesterone and related substances, is described, and their possible derivation from cholesterol discussed. S. describes several other substances which have oestrogenic properties, even though they do not contain the phenanthrene nucleus, and refers to the possibility that the natural oestrogen, oestradiol, is decomposed in the body and produces a substance which contains the diphenyl group.

II. There is strong evidence that progesterone is the actual hormone of the corpus luteum, oestradiol the ovarian hormone, and testosterone the male hormone, and S. discusses their action and specificity. Oestrogens are excreted in the male and are found in the testes in some species. Androgens are excreted in the female and are found in the ovary. Some androgens produce oestrous changes in the female, including growth of the uterus, and even pregestational development of the endometrium, as brought about by the luteal hormone. Oestrogens produce certain changes in the male, including development of the muscle of the vesiculæ. Certain substances (*e.g.*, androstenediol) have both oestrogenic and androgenic actions. Some pathological changes produced by the sex hormones in the prostate, especially by oestrogens, are reviewed, and some of the clinical uses of the hormones discussed.—J. M. ROBSON.

McKENZIE, F. F., & ANDREWS, F. (1937). **Estrus and Ovulation in the Mare. (A Preliminary Report)**.—*Proc. Amer. Soc. Anim. Prod.* 1937. pp. 64-70.

The psychological and physiological phenomena exhibited by 46 mares throughout the foaling and breeding season between April 16th and July 10th, 1937 are noted.

The authors found the average length of oestrus to be 5.54 days, with a range of 1-27 days. The average mare passed out of heat 0.86 of a day after a corpus luteum could be detected. The average length of di-oestrus was 15.26 days, with a range of 6-29 days, 82% falling within the period of 13-17 days inclusive. The interval between parturition and the first oestrus ranged between 2 and 12 days, with a mean of 7.25 days.

In general, the follicle was tense and firm the first day of oestrus and as development continued it stood out prominently and was often so firm to touch that it seemed solid. Shortly before ovulation the follicle became more fluctuating. During the first and second days following ovulation the corpus luteum increased in firmness and could be detected by palpation. As the inter-oestral period progressed it became more difficult to detect the corpus luteum with certainty.

The average size of follicles was estimated at 2.7 cm. on the first day of oestrus

and 3.2-3.8 cm. on the day of ovulation. Mares with heat periods longer than the average tended to develop larger follicles, the average on the seventh day being 4 cm. and on the eighth day, 5 cm. Ovulation was found on an average to occur 4.86 days after the onset of oestrus, the range being from one to 11 days.

The pH of cervix and vagina was found to vary within a range of 7.2-8.5 during the oestral cycle; the cervical secretion was nearly always less alkaline than the vaginal, but both were definitely alkaline. The highest readings were found just prior to ovulation and the lowest seven days after oestrus.—J. G. MURRAY.

CORNER, G. W. (1938). **The Sites of Formation of Estrogenic Substances in the Animal Body.**—*Physiol. Rev.* 18. 154-172. 2 figs. [Numerous refs.]

Research done over the last twenty years, though not providing definite proof, indicates strongly that the usual site of production of the oestrogenic hormone is the theca interna of the Graafian follicle. Hormone production probably begins when the follicle is small and continues as it grows larger.

It has been shown that oestrogenic substance is produced by the corpus luteum, though the functional significance of this production is still a matter of conjecture. Evidence is accumulating to show that a certain amount of oestrin is required to support the corpus luteum and, in view of the commonly-assumed suppressive action of the corpus luteum on follicular growth, it may be that the production of oestrogenic hormone by the corpus luteum is a means of providing against its own premature decay through lack of oestrin.

From the observations of many workers it is certain that an extra-ovarian source of the oestrogen in placenta, blood, and urine during pregnancy must be postulated. That this source is the placenta itself is the best hypothesis, but certain other possibilities remain to be excluded.—J. G. MURRAY.

COLE, H. H. (1938). **High Gonadotrophic Hormone Concentration in Pregnant Ponies.**—*Proc. Soc. exp. Biol., N.Y.* 38. 193-194. 1 table. [2 refs.]

It appears that an inverse relationship exists between body size and gonadotropic hormone content in pregnant mares. Studies of the concentration in the sera of ten Welsh ponies showed that a concentration of 200-400 rat units per c.c. was uncommon, whilst in thoroughbred or draft mares the concentration never exceeded 200 rat units per c.c.—H. V. HUGHES.

SARTORIS, P. (1938). Contributo allo studio del comportamento follicolare e luteinico nell'ovaio della bovina, in stato di gravidanza. [**Folliculin and Lutein Content of the Ovaries of Pregnant Cattle.**]—*Nuovo Ecol.* 43. 201-214 and 241-268. 20 figs. on 10 plates, 3 tables. [Numerous refs.]

A detailed report of the histological examination of the ovaries of 58 cows at different stages of gestation. The findings are in accordance with facts already well known.—J. A. NICHOLSON.

## TECHNIQUE AND APPARATUS

- I. SCHÜTZ, F. (1937). Demonstration eines neuen Nährbodens. [**A New Culture Medium.**]—*Zlb. Bakt. I. (Orig.)*. 140. \*118-\*120.
  - II. RASCH, K. (1938). Versuche mit dem Brillantgrün-Phenolrotagar. [**The Use of Brilliant Green-Phenol Red Agar.**]—*Berl. tierärztl. Wschr.* Jan. 28th. 54-55. [8 refs.]
- I. S. found polyvinylalcohol ( $C_2H_5OH$ ) very useful as a substitute for agar.

The alcohol was first dissolved by boiling with broth and then Congo red was added. The bacteria under test (those of the coli-typhoid group, *Staphylococcus aureus* and *Bact. subtilis*) showed as profuse a growth as on agar. After addition of 3% milk-sugar and bromthymol blue, it proved a satisfactory medium for the differentiation of bowel bacteria. *Bact. coli* and *Bact. lactis aerogenes* appeared as yellow colonies on a bright reddish base, whilst *Salmonella typhi*, *S. paratyphi* B, and *S. enteritidis* appeared as blue or greenish-blue colonies.

II. R. states that brilliant green-phenol red agar is more useful than malachite agar, which is the official medium recommended in bacteriological meat inspection in Germany for differentiating *Bact. coli* and salmonella organisms. In the former medium *Bact. coli* organisms show up as whitish-green colonies, whilst those of the salmonella group have a distinct red colouration. The basis of the medium used by R. consists of meat broth, peptone water and agar.—M. F. BENJAMIN.

I. VON HENNYEY, E. (1937). Untersuchungen über die Gebrauchsfähigkeit von Bakterienfiltern. [The Efficiency of Filters for Bacteria].—*Zlb. Bakt. I. (Orig.)*. 140. 74-76. 1 table. [9 refs.]

II. HOFMANN, P. (1937). Ueber die Brauchbarkeit der Jenaer Glasfilter zur keimfreien Filtration. [The Efficiency of the Jena Glass Filter for Bacterial Filtration].—*Ibid.* 76-80. 1 fig. [4 refs.]

I. A number of different organisms varying from 0.3 to 1.5 $\mu$  in size, and suspended in saline from different media or in broth were tested on Berkefeld N filters. The suspension was poured on to the filter and placed in the incubator at 37°C. for periods varying from 30 minutes to 48 hours. Suction was applied at 0.6 atmospheres, and the filtrate inoculated into broth or on to agar slopes.

*Salmonella typhi*, *S. paratyphi* A and B, and the proteus bacillus grew through the filter in one hour. Therefore, the results of filtrations which require several hours must be accepted with reserve.

II. The new Jena glass filter was compared with a Berkefeld W filter by filtering various substances through both types.

Both retained saline suspensions of *Chromobacterium prodigiosum*, *Brucella melitensis* and *Bacillus mesentericus* spores. *Chr.p.* grew through one grade of glass filter in nine days, and through another grade and through the Berkefeld in 14 days. *S.t.* grew through both in two days.

The two grades of glass filter tested compared unfavourably with the Berkefeld when used to filter high titre *Br. abortus* agglutinating serum and tetanus toxin. The loss of titre in the one case and the loss of toxicity in the other was much greater with the glass filters than with the Berkefeld.

A 1% strychnine solution showed no loss after filtration through the glass filters, but considerable loss after filtration through the Berkefeld.—G. SLAVIN.

MORTON, H. E., & CZARNETZKY, E. J. (1937). The Application of Sintered (Fritted) Glass Filters to Bacteriological Work.—*J. Bact.* 34. 461-464. 1 fig. [13 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* 13. 227. Signed G. S. WILSON].

Sintered glass filters have been used by several workers for different purposes. The present report draws attention to their value in bacteriological work. Observations were made with a sintered glass disc, 30 mm. in diameter, of "5 auf 3" porosity. The disc was fitted into a funnel of 80 c.c. capacity, which passed through a rubber stopper into a test tube with a side arm. A pressure of about 75 cm. of mercury was applied during filtration. With this apparatus it proved possible to filter about 50 c.c. of a clear solution in half an hour. After

use the filters were boiled in distilled water for 15 minutes, and cleaned by heating to 80°-90°C. in concentrated  $H_2SO_4$  to which a little  $NaNO_3$  and  $NaClO_4$  had been added. They were left overnight in this solution and rinsed thoroughly the following morning. About 200 c.c. of distilled water were then sucked through to remove the acid. For use they were sterilized by autoclaving at 120°C. for 80 minutes. Experience showed that they withstood the ordinary bacteria. They were found of value for the filtration of sugar solutions and of serum, as well as for the preparation of toxic and lytic filtrates. The filters carry a negative charge. They are particularly useful when small amounts only of material are available for filtration.

SWIFT, H. F., & HIRST, G. K. (1937). **An Apparatus for Grinding Bacteria at Low Temperatures.**—*Proc. Soc. exp. Biol., N.Y.* **37**. 162-166. 1 fig. [Copied *verbatim* from *Bull. Hyg., Lond.* **13**. 227. Signed G. S. WILSON].

Bacilli are frozen and dried by the lyophile or the desiccator method. They are then introduced into a stout Pyrex flask of one litre capacity containing about 500  $\frac{1}{4}$ -inch stainless steel balls. The flask is cooled to -75°C. by a mixture of methyl cellosolve and  $CO_2$  ice, and is rotated at 230 r.p.m. by means of an electric motor. The whole apparatus is well insulated. One to three hours' grinding is sufficient to disrupt 1 gm. of dried haemolytic streptococci.

SCHWARZMAIER, E. (1937). Hinweis auf eine zweckmässige Tropfen-Injektions-spritze. [A "Single Drop Dose" Injection Syringe].—*Berl. tierärztl. Wschr.* Nov. 19th. 717-718. 3 figs.

S. describes a syringe for intradermal injections and for the instillation of small amounts of mallein or tuberculin on to the eyes. The syringe is graduated to deliver a single drop of 0.01 c.c.—M. F. BENJAMIN.

I. ANDRES, T. (1937). Technik der Blutentnahme und der intravenösen Injektion beim Rindvieh und beim Schwein. [Technique of Collection of Blood Samples and of Intravenous Injections in Cattle and Swine].—*Schweiz. Arch. Tierheilk.* **79**. 383-387. 1 fig.

II. SACHAROW, B. (1937). Zur Technik der sterilen Serumgewinnung bei der Maus. [A Technique for the Aseptic Removal of Serum from Mice].—*Zlb. Bakt. I. (Orig.)*. **140**. 73-74. [2 refs.]

I. A. describes the customary techniques for collection of blood from, and injection of fluids into the milk vein in cattle and the ear vein in pigs.

II. The mouse is placed in a glass jar containing highly concentrated chloroform vapour. The latter produces auricular fibrillation and heart-failure in diastole. The chest is then opened, the heart grasped with forceps and a short needle (1.2 x 15 mm.) is quickly inserted into the right ventricle. It is then possible to draw up about 1 c.c. of blood from the heart.—M. F. BENJAMIN.

VON GUOTH, G. A. (1938). Bluttransfusion bei Pferden und Hunden. [Blood Transfusion in Horses and Dogs].—*Wien. tierärztl. Mschr.* **25**. 361-369 and 393-402. 1 fig. [Numerous refs.]

Blood transfusion may be satisfactorily carried out in domestic animals by the indirect method using 10% sodium citrate as an anticoagulant. Whilst it is better to carry out some simple test such as mixing a few drops of the donor's blood with serum from the patient, in order to detect the presence of iso-agglutinins, before the transfusion, blood groups are not so well marked in animals as in man. The blood may be given by any of the recognized routes for injections.

In horses, 1000 c.c. of blood can be safely transfused in 8-9 minutes, and, as a rule, there is practically no disturbance, even of the pulse rate, following such an injection. Repeated transfusions from the same donor to the same recipient do, however, produce anaphylactic shock, which is characterized by staggering, muscular tremors, sweating, rapid pulse, a rise of temperature and urination. Blood transfusion is contra-indicated in cases where organic disease of the heart is present. It is indicated after haemorrhage, in infectious disease and in such conditions as azoturia, etc.

In dogs, up to 200 c.c. of dog blood may be injected into the abdomen. After repeated injection there may be vomiting, haemoglobinuria and other signs of mild anaphylactic shock, but the symptoms soon pass off.

The injection of blood from one species of domestic animal into a different species is always followed by pronounced haemoglobinuria, vomiting, etc.; the number of erythrocytes in the circulating blood is rapidly reduced, and there may be a pronounced anaemia.—J. A. NICHOLSON.

SVEDBERG, T. (1937). **The Ultra-Centrifuge and the Study of High-Molecular Compounds.**—*Nature, Lond.* **139**. 1051-1062. 16 figs., 1 table. [Numerous refs.]

A description of the ultra-centrifuge itself and of its various uses is illustrated by diagrams and photographs.

In the case of substances of high molecular weight such as proteins and complex polysaccharides there are usually present in the same solution a number of molecular species differing in mass and shape, which can be sorted out into different zones by means of the ultra-centrifuge, the forces of which can go as high as "a million times gravity".

Measurement of the "sedimentation velocity", *i.e.*, the rate of settling of the molecules, or of the "sedimentation equilibrium", *i.e.*, the balance between settling and diffusion reached after prolonged centrifuging (days, if necessary) then provides information on the molecular dimensions of the components of a solution.

The apparatus itself consists of a strong steel rotor driven by high pressure oil on the turbine principle, enclosed in a massive steel housing. Up to speeds of 20,000 r.p.m. the rotor can be supported on ball bearings. At high speeds, up to 160,000 r.p.m., journal bearings of oil-lubricated white metal are suitable. Various damping devices are adopted to prevent slight irregularities building up into dangerous vibrations. To diminish friction, rotation is arranged to take place in a medium of low viscosity, usually hydrogen, under reduced pressure sufficient to minimize friction without unduly diminishing conductivity of heat.

For low speeds the rotor may be of cylindrical outline, but for higher speeds an oval shape with two cell holes, one for the solution cell and one for the balancing cell, is chosen to reduce the strain. The cells themselves are sector-shaped with ultra-violet transparent windows to allow of studies of distribution of components by optical means during rotation, *i.e.*, by refraction or light absorption of phases of different concentration.

When using the absorption method, photographic exposures of the sedimenting column are made from time to time using a light of selected wave-length absorbed by the dissolved substance. The photographic pictures are then measured by a microphotometer and give the relation between  $c$  the concentration and  $x$  the distance from the centre of rotation. Each molecular species then comes out as a step on the  $c$ - $x$  graph. If changes are measured by means of refractive index the different molecular species are recorded on the plate like lines in a spectrum.

If pictures of a finely ruled scale are taken through the sedimenting column of solution, by light of a wave-length which is not absorbed, and the displacement of the lines measured, the concentration gradient can be shown as a curve in which each molecular species appears as a maximum point.

The use of the ultra-centrifuge for the investigation of proteins is discussed at some length. For instance the stability diagram of *Helix* haemocyanin shows only one component at the isoelectric point, but on changing the pH the original molecule of weight 6,740,000 dissociates stepwise into halves, eighths and sixteenths. These pH dissociation products represent perfectly homogeneous components.

Illustrations are given of the use of the sedimentation picture for studying pathological sera, viruses such as tobacco-mosaic, obscure components of milk proteins, and characters of respiratory pigments. The technique obviously provides a new line of approach for many problems of veterinary interest.—H. H. G.

ANON. (1936). **The New Ultracentrifuge Installation at the Lister Institute.**—*Lancet*. 231. 874.

The two new ultracentrifuges have optical arrangements which make it possible to observe and photograph the contents of the rotating cell. The smaller of the two machines, which is called the equilibrium centrifuge and runs at speeds up to 18,000 r.p.m., usually for several days and nights continuously, is used for the determination of absolute particle size or weight. The larger machine generates centrifugal forces up to half a million times gravity, and is used to measure the sedimentation velocity constant of pure proteins and of the components of a mixture. In the case of native protein mixtures such as blood-serum, it is possible to centrifuge these without previous chemical treatment and to determine from the photographs the concentrations in which the component proteins are present.

—R. ALLCROFT.

## MISCELLANEOUS

EDWARDS, J. T. (1938). **The Veterinary Record—1888-1938: A Historical Review.**—*Vet. Rec.* 50. 875-912. 9 appendixes. [Numerous refs.]

This is a very scholarly review of veterinary affairs in Great Britain from about 1828 onwards, leading up to 1888, the date when the *Veterinary Record* was founded by William HUNTING.

Something is said about foreign veterinary periodicals, by way of showing the advance in veterinary science at home and abroad, and the history of the past and present English periodicals is worked into the story so that the reader may appreciate the various events in perspective.

Numerous quotations, in the form of appendixes, are made from the writings of the great veterinary figures of the last century.—J. E.

McKINNA, W. R. (1938). **Some Important Provisions of the Disease of Animals Acts.**—*Vet. Rec.* 50. 939-944.

The author summarizes the chief provisions of the Diseases of Animals Acts and Orders, England and Wales, with regard to the operation of stock markets, including market accommodation for poultry, the prevention of spread of animal diseases and the prevention of cruelty to cattle and poultry, either while exposed for sale or in transit to and from markets.

He considers the question of over-stocking of dairy cows, the exposure for sale of cattle which have recently aborted, and the dressing of warble-infested

cattle. An outline is given of the procedure followed in dealing with reported cases of bovine tuberculosis, swine fever, parasitic mange of horses, asses and mules, anthrax, sheep scab and, very briefly, foot and mouth disease. Subsidiary regulations designed to prevent or control the spread of scheduled diseases are mentioned, including those governing prescribed methods of disinfection, boiling of animal foodstuffs, disposal of imported packing material and keeping of records of movement or transit of stock.—H. BURROW.

## OFFICIAL AND OTHER REPORTS

UNION OF SOUTH AFRICA. (1937). **Annual Report of the Division of Veterinary Services.** [DU TOIT, P. J.]—*Fmg S. Afr.* 12. 518-527. 9 tables, 5 graphs.

### FIELD WORK

There was a slight increase in the number of outbreaks of ANTHRAX, but the mortality was very low. In December, 1937, more than 50 herds were under regular tests for TUBERCULOSIS, and much valuable information was obtained on the value of the intradermal test with locally-made tuberculin.

During the year, centres of infection with DOURINE were discovered in the Western Province, the disease having apparently been introduced from the North West Cape area. An eradication scheme was adopted, and block (area) tests were commenced for the eradication of the disease. Progress in the eradication of EAST COAST FEVER was made in all the provinces where it existed. The slaughter method, where it could be adopted, undoubtedly gave the best results.

No cases of FOOT AND MOUTH DISEASE occurred in the Union, but the existence of outbreaks in Bechuanaland and Southern Rhodesia made constant vigilance necessary, particularly as smuggling of cattle was continually going on from Bechuanaland. Two outbreaks of SWINE FEVER, which occurred in the Northern Transvaal, were eradicated by slaughtering out. Although only seven cases of RABIES were recorded, the position was regarded as unfavourable, and there appears to be a tendency for the disease to spread, the incidence in the mongoose making its control very difficult.

Of the 93 outbreaks of SHEEP SCAB recorded in the year, 91 were in the Cape Province and Transvaal, most of them in the North-West Cape area.

### RESEARCH AT ONDERSTEPSPOORT LABORATORY AND SUBSTATIONS

INFECTIOUS DISEASES.—The value of the saponin vaccine for ANTHRAX was tested on a very large scale, with good results. A vaccine made from avirulent variants of *Bacillus anthracis* was tried out experimentally, but the results in the field are not yet available. Two outbreaks of abortion in cows due to infection with *Trichomonas foetus* were recorded. This is the first time the disease has been encountered in the Union.

The work on HORSE-SICKNESS was mainly devoted to improvements in the technique of vaccine production. The duration of the immunity and the antigenic structure of the different viruses were studied. In connexion with the study of HEARTWATER, the relationships of a number of rickettsia types from different animal species were studied. No success attended the attempt to acclimatize either HEARTWATER or BLUETONGUE in laboratory animals.

OTHER DISEASES.—Investigations were made into the life-history of *Gaigeria* in sheep, infection being found to take place through the skin. A survey of the prevalence of *Gaigeria* in the Union was initiated. Also a tick survey of the Union was initiated which will take several years to complete. Under poultry diseases,

studies were carried out on avitaminosis-B, and breeding experiments for the elimination of CANCER in poultry were continued.

The use of bone biopsy as an aid in the diagnosis of nutritional deficiencies in cattle and sheep was introduced and found of great value. Experiments on the normal copper content of organs were continued and some experiments on the partition of blood proteins were initiated. In the course of the dietetic and biochemical work, the effect of iodine on reproduction in sheep and the influence of fluorine in phosphates on animal health were investigated. Vitamin A-deficiency was produced in cattle and vitamin D-deficiency in pigs, the latter leading to a bone disease.

A simple test was evolved to differentiate, at meat inspection, between the yellow discoloration in carcasses caused by plant pigments and that caused by icterus. A great variety of specimens were tested for different poisons. A proprietary preparation, lentin, was tested as a purgative for ruminants, with promising results. Investigations were carried out to ascertain the cause of an alarming mortality among sheep in the Orange Free State, but without success.

VARIOUS.—The influence of diet and chemical substances on the motility of the rumen, abomasum and large intestine of sheep was studied and various other experiments on the physiology of digestion in the merino sheep were carried out. The studies on the effect of environment on growth, development, production, etc., were continued, but some years will have to elapse before the results and the statistical evidence can be written up. Much attention was given to the study of synthetic fibres as substitutes for wool.—E. M. ROBINSON.

Fiji. (1937). **Annual Report of the Veterinary Division for 1936.** [TURBET, C. R.]—*Ann. Bull. div. Rep. Dep. Agric. Fiji, 1936.* pp. 50-59. 8 tables.

ANIMAL DISEASES.—TUBERCULOSIS was the most serious disease amongst cattle. Amongst the dairy herds supplying Suva, which have been regularly tested over a period of six years, less than 1% reacted. Amongst other cattle tested the percentage was over 10. The latter figure gives a more accurate indication of the incidence of the disease.

Losses due to CONTAGIOUS ABORTION decreased as compared with previous years. The use of live vaccine as an immunizing agent was continued in one badly affected area, with satisfactory results.

Minor disease conditions of stock were MASTITIS and INFECTIOUS KERATITIS of cattle, enteric infection of calves, OSTEOPOROSIS and BALANITIS in pigs, and FOWL POX, COCCIDIOSIS and BOTULISM in poultry.

GENERAL.—Poultry breeding was commenced by the Department of Agriculture with a view to improving the breed of fowls amongst Indian and Fijian small farmers.

New laboratory accommodation was provided for the Veterinary Division at the Government Bacteriological Laboratory.—H. M. S.

Fiji. (1938). **Annual Report of the Veterinary Division for 1937.** [STUCHBERRY, H. M.]—*Ann. Bull. div. Rep. Dep. Agric. Fiji, 1937.* pp. 32-36. 7 tables.

The tuberculin test was extended for the first time to several dairies outside the Suva dairy area. The cattle tested numbered 2,535, with 11.95% reactors. In the Suva dairy herds, 894 were tested with 1.54% reactors. Contagious abortion caused negligible losses. Kidney worm of swine was well controlled. Poultry losses from disease are high. The importation of cattle from Australia was prohibited by proclamation owing to the outbreak of ephemeral fever in that country. Jersey dairy cattle do not appear to do as well as Friesians and Shorthorns. Two

Red Polled bulls were imported by the Department of Agriculture. The dairying industry had a good year.

The quantity of butter manufactured was 687,259 lb. and of ghi, 189,129 lb. The newly established government poultry farm at Nasinu made reasonable progress.—C. R. TURBET.

- I. LECLAINCHE, E. (1938). La situation sanitaire en 1937. [**The Animal Diseases Situation in Europe in 1937**].—*Bull. Off. internat. Epiz.* 16. 5-16 and 92. Discussion pp. 285-292. [1 ref.]
- II. LECLAINCHE, E. (1938). Rapport administratif du Directeur de l'Office pour l'année 1937-1938. [**Administrative Report of the Director of the Office International des Epizooties 1937-1938**].—*Ibid.* 259-265.
- III. —. (1938). Résolutions adoptées dans la 12e Session du Comité de l'Office International des Epizooties. [**Resolutions Adopted at the 12th Session of the Committee of the Office International des Epizooties**].—*Ibid.* 415-416.

I. The year was marked by an outbreak of FOOT AND MOUTH DISEASE in virulent form which spread over all parts of Europe: there is nothing of particular note to record about other diseases. As usual, notes are given on anthrax, bovine tuberculosis, swine erysipelas, glanders, blackleg, epizootic lymphangitis, dourine, swine fever, sheep pox, rabies, and avian infections.

II. L. again deplores the incompleteness of disease statistics received. At a special meeting of four members of the committee of the Office in January, 1938, it was arranged that trials on an international basis should be carried out in France on certain methods of immunization against F. & M. Disease. The French government placed the Research Laboratory at Alfort at the disposal of the Office. The actual work is to be carried out by research workers sent by countries where promising new methods of immunization have originated.

Albania and Algeria joined the Office during the year.

III. (a) F. & M. Disease.—It was agreed that slaughter is the most effective control method, and that it should be used as much as possible. Disinfection, stand-still orders and prophylaxis by sero-infection should be used where practicable.

(b) Sale of remedies.—It was agreed that sale should be prohibited until remedies had been scientifically tested.

(c) Influence of livestock management and feeding on infectious and parasitic diseases.—The importance of these factors was recognized and the desirability of research on the subject was expressed.

(d) Prophylaxis of Epizootics.—The conclusions of MÜSSEMEIER and of VERGE were supported.—J. E.

## BOOK REVIEWS

MÖNNIG, H. O. [Dr. Phil., B.V.Sc., Professor of Parasitology, Faculty of Veterinary Science, University of Pretoria; Veterinary Research Officer, Onderstepoort, South Africa]. (1938). **Veterinary Helminthology and Entomology. The Diseases of Domesticated Animals Caused by Helminth and Arthropod Parasites.** pp. xviii + 409. 264 figs., 12 plates, 1 table. [Numerous refs.] London: Baillière, Tindall & Cox. [2nd Edit.] [8vo] [20s.]

The second edition of this excellent text-book has followed very quickly after the first publication [*V. B.* 4. 795.] so that it is not surprising to find an addition of only seven pages to the text. The revision has been very carefully carried out, however, and several small additions have been made to accounts of life-histories.

The most notable alterations, however, are found in the account of treatments; the author's new treatment by mouth for nodular worm (*Oesophagostomum columbianum*) in sheep with a mixture of copper arsenate, copper tartrate and calcium hydroxide has been substituted for the treatment *per rectum* previously recommended. N-butylidene chloride has been added to the list of recommended treatments for strongylosis in horses, and intratracheal injections, while the animal is held on its back, for husk in sheep.

An alteration, the reason for which it would be interesting to know, is the reduction of the dose of copper sulphate and nicotine sulphate for trichostrongylosis and monieziosis in sheep and cattle to one third of that recommended in the previous edition.—E. L. TAYLOR.

SCHILLING, C. (1938). [Prof. Dr. Abteilungsdirektor am Institut Robert Koch i.R.]. Die Methoden der experimentellen Chemotherapie. [**Methods of Experimental Chemotherapy**]. pp. 104. 18 figs., 1 table. [Numerous refs.] Jena: Gustav Fischer. [8vo] [RM.4.50].

In this short book the author has attempted to describe systematically the main methods which have been used in experimental chemotherapy and the advances made. He has succeeded in producing a book which contains a vast amount of information, despite the necessity for condensation, and the wide scope of the subject.

The methods of testing the value of drugs both *in vitro* and *in vivo* are discussed, and also the laboratory animals which may be used for experiment, the methods of infecting them, the various methods by which drugs may be administered, and the variation in the action of drugs as they affect the parasite and the host. The chemical composition of the more active compounds is given, and the interrelationship of the members of the various groups.

After discussing the treatment of bacterial, protozoan, helminth and virus infections and the methods of estimating the efficacy of treatment, the author goes on to discuss the experimental work which has been done on the theory of chemotherapeutic action, and such subjects as interference, drug fastness and the persistence of drugs in the host.

The book is a valuable addition to the literature available, and if some recent work has not been included, and other work seems to have been accepted too readily, *e.g.*, the action of acaprin on theilerial schizonts, yet it gives a very complete picture of modern methods of testing the value of drugs and endeavouring to ascertain the mechanism of their action.—U. F. RICHARDSON.

OPPERMANN, T. [Prof. Dr. Direktor der Medizinisch-forensischen Klinik an der Tierärztlichen Hochschule zu Hannover]. (1938). Die Fohlenlähme und ihre Bekämpfung. [**Navel-ill in Foals and its Control**]. pp. 56. 3 figs. [Numerous refs.] Hanover: M. & H. Schaper. [8vo] [RM. 1.60].

The object of the booklet is to provide up-to-date information on an important subject in a form readily accessible to all veterinary practitioners, and this aim is furthered by its very low price.

O. considers that domestication is the basic cause of the various diseases of foals, and goes on to describe the different types and their treatment along the lines of recent work in Germany and elsewhere [*V. B.* 6. 157].

He brings in a new causal agent of foal disease, *viz.*, the virus of equine infectious anaemia, which, he considers, is capable of causing rapid death in foals during the first few days of life.

The mode of infection in navel-ill is discussed in some detail and some interesting anatomical distinctions between the foetal circulation in foals and that in

calves are brought out to account for the genesis of equine navel-ill and calf diarrhoea.

The cutting and ligation of the navel cord is condemned, and its tearing by force followed by disinfection is urged.

O. considers that an over-abundant milk supply is an important factor in the pathogenesis of navel-ill, and advocates elaborate dietetic rules, utterances which strike the reader as opposed to the doctrine of return to nature emphasized in the introduction.

The literature on prophylaxis and curative treatment is reviewed rather uncritically, so that the reader hardly knows what to use and what to leave unused.

On the whole this concise treatise, with its 86 selected references dating from 1926 onwards, is very welcome.

[The term "Fohlenlähme" and the English equivalents "joint-ill" and "navel-ill" are rather unsatisfactory in the light of the present knowledge on diseases of young foals. It would be better to name the infection in each case].

—J. E.

— (1937). **The Onderstepoort Library Index 1937.** pp. 153. Pretoria: Govt. Printer. [4to] [2s. 6d.]

The chief advantage of the system used for this index is its simplicity; any possible waste of time or confusion that might even so arise can be easily avoided if the two introductory pages of explanation are read. The system caters mainly for workers on specialized subjects; it is centralized, titles being referred as far as possible to wide main headings, which are then further subdivided. Cross-indexing is usually avoided, but an alphabetical key is included to show the reader where to begin his search.

The subjects are set out under 29 main headings numbered serially, as follows:—

1. Anatomy; 2. Animal Husbandry; 3. Bacteriology; 4. Biometry; 5. Botany; 6. Chemistry; 7. Embryology; 8. Entomology; 9. Filterable Viruses; 10. Helminthology; 11. Histology; 12. Human Medicine; 13. Hygiene; 14. Immunology; 15. Medicine; 16. Obstetrics and Gynaecology; 17. Psychology, Animal; 18. Pathology; 19. Pharmacology; 20. Physiology; 21. Poultry; 22. Protozoology; 23. Radiation; 24. Skin Diseases; 25. Surgery; 26. Toxicology; 27. Veterinary Science; 28. Wool, and 29. Zoology.

These main headings are then subdivided as may be necessary; in most cases there are five or less subdivisions. An example will show how the system is applied. A reader looking for a reference to *Babesia caballi* would turn first to the key. Here he would find that references to this organism are in the category 22 : 4 : 4 : 5 : 3 : 2. Reference to the main index shows that heading 22 is "Protozoology"; 4 is a sub-heading under this, "Sporozoa", the second 4 is a further sub-heading, "Haemosporidia", 5 is the sub-heading "Babesidae", 3 is a subdivision of this, "horse", and the final 2 stands for the organism itself, *Babesia caballi*. The card index consists of indicator cards with title cards behind them. On the indicator card is written the name of the subject, and its index number, e.g., Protozoology . . . 22; Leishmania . . . 22 : 2 : 1; *Babesia caballi* . . . 22 : 4 : 4 : 5 : 3 : 2.

This system of classification is especially suitable for a library dealing with a specialized subject, as very detailed subdivisions are possible; under "Toxicology", for example, there is a division numbered 26 : 6 : 87, representing "Toxicology: Poisonous Plants: Zygomycophyceae". Under this system the fact that there is such a large number of plant families to be indexed is no reason why they should not all be dealt with as separate subdivisions.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

---

Vol. 9.]

March, 1939.

[No. 8

---

DISEASES CAUSED BY BACTERIA AND FUNGI

- I. HADLEY, F. B. (1936). **Rennet Test for the Detection of Mastitis.**—*J. Dairy Sci.* 19. 165-169. 2 tables. [10 refs.]
- II. BURKEY, L. A., SANDERS, G. P., & CONE, J. F. (1936). **The Significance of Bacterial and Chemical Changes Occurring in Mastitis Milk and their Correlation with Milk Production.**—*Ibid.* 496.
- III. LITTLE, R. B. (1938). **Bovine Mastitis III. A Comparison of the Bacteriological and Physiological Reactions of Normal and Mastitis Milk from Young Cows.**—*Cornell Vet.* 28. 23-33. 3 tables. [Numerous refs.] [See also *V. B.* 8. 263].
- IV. FAY, A. C., CAVE, H. W., & ATKESON, F. W. (1938). **Detection of Mastitis by the Brom-Thymolblue Test, Leucocyte Count, and the Microscopic Examination of Incubated Samples of Milk.**—*Ibid.* 40-50. 6 tables.

I. In the test here described, 0.1 c.c. of 1 : 50 commercial rennet solution is added to 5 c.c. of milk, which is then incubated at 22°-28°C. for one hour and examined for evidence of coagulation. Samples from individual quarters must be used, and mid-milk or strippings in preference to fore-milk. The result often varies from week to week.

A comparison with other methods of diagnosis on 314 quarter samples, of which 21% were classed as abnormal on the combined evidence of all the tests used, showed that the rennet test gave almost the same number of positive results as the catalase or bacteriological tests, but less than the brom-cresol-purple or chloride tests. The test is dependent on the amount of casein present and is of particular value for the detection of those samples which are unsuitable for cheesemaking. Poor coagulation indicates subnormal casein and mastitis.

II. The authors followed, by weekly milk examinations, the changes in numbers of organisms, leucocytes, chlorides, pH, non-casein nitrogen, rennet coagulation time, and milk yield of first-calf heifers infected with streptococcal mastitis. They conclude that these changes follow a definite sequence, but that certain changes (*e.g.*, the number of organisms, cells and chlorides) reach a peak earlier than others (*e.g.*, the pH and non-casein nitrogen), whilst others (*e.g.*, the cell content and milk yield) show more prolonged changes. It is also suggested that certain changes regarded as evidence of inflammation, *e.g.*, increase of cells and alteration of rennet coagulation properties "may predispose to infection with *Str. mastitidis*."

III. A review is given of the results obtained by a daily laboratory examination of fore-milk from 81 quarters of eight first-calf heifers before and after experimental infection with mastitis streptococci. Fore-milk was used (including the first stream), usually without centrifuging. The pH was determined on a plate with phenol red, brom-cresol-purple and methyl red, the chlorides by a modification of Rosell's method, the leucocyte count by Prescott and Breed's direct method, and the bacteriological control by deep plating in blood agar and subsequent identification of suspect colonies by the usual methods.

In 1,010 daily examinations made before infection, most of the results fell within the limits generally accepted for normal milk, *viz.*, pH about 6.6, chlorides 0.135% or less, and leucocyte count  $3 \times 10^5$  per c.c. or less—in 70% of cases it was under 500.

After experimental infection, 2,168 daily examinations were made. It was found that plating in blood agar gave more reliable results than any other method, typical haemolytic streptococci being detected on every occasion. In 65% of the examinations, the total bacterial count was  $3 \times 10^8$  to  $2 \times 10^4$ ; the higher counts contained usually only haemolytic streptococci. The next most reliable test was the leucocyte count; in 94% of examinations, it was between  $3 \times 10^5$  and  $4 \times 10^7$  or over per c.c. The pH and chloride tests proved of less value because about half the samples gave values within the limits of normality, and many others, values only slightly above these limits.

A table is given showing that in 24 tests made 8-10 days after inoculation in two heifers, the first milk drawn contained over ten times as many streptococci as middle milk or strippings.

IV. Cows belonging to the Kansas State College herd (about 112 head) were divided into three classes on the basis of monthly examinations (fortnightly examinations in doubtful cases) *viz.* :—Class A—animals which were regarded as free from mastitis; Class B—animals regarded as suspicious because of a high leucocyte count ( $5 \times 10^6$  or more per c.c.) in the milk from one or more quarters; Class C—cows regarded as positive because of the presence in incubated milk samples (about 16 hours at 37°C.) of long chained streptococci and, usually, an associated high leucocytic count. Bromthymol blue tests were also made.

Nearly 7,000 comparative tests of the three methods referred to above were carried out and the following conclusions were reached :—A positive bromthymol blue result is very good evidence of mastitis, being misleading less than once in ten times: nearly four fifths of the tests from positive quarters were, however, negative. A negative bromthymol blue result is therefore of doubtful significance: in fact, in this herd, although there were many more mastitis-free than mastitis-infected cows, the chances of a negative result being correct or false were even. Leucocyte counts above  $5 \times 10^5$  per c.c. were found in only about one-third of those samples which showed long-chained streptococci. Long-chained streptococci were not found in about one out of seven samples from quarters which had already been classed as infected owing to the presence of such streptococci. Leucocyte counts above  $10^5$  per c.c. and chains of medium length were frequently found to be indicative of impending mastitis. Some cases, however, occurred without any warning. Mastitis was found in 13% of heifers in their first lactation, in 88% of animals in their second lactation and in an increasing percentage of animals in later lactation periods.

Experience showed that when an animal had once been justifiably removed from Class A to Class B or C, it was seldom wise to put it back in a higher class. Certain animals, after extensive tests, were so re-classified, and in nearly all cases the animals had later to be brought back again to a lower class.—A. W. STABLEFORTH.

- I. WHITE, G. C., ANDERSON, E. O., JOHNSON, R. E., PLASTRIDGE, W. N., & WEIRETHER, F. J. (1937). **Infectious Bovine Mastitis. 5. Bovine Mastitis and Milk Yield.**—*Bull. Storrs agric. Exp. Sta.* No. 220. pp. 85. 6 tables, 5 graphs, 1 appendix. [8 refs.]
- II. PLASTRIDGE, W. N., ANDERSON, E. O., & SEREMET, J. S. (1938). **Infectious Bovine Mastitis. 6. A Laboratory Procedure for the Detection of Bovine Mastitis.**—*Ibid.* No. 224. pp. 12. 8 tables. [6 refs.]

I. The authors present detailed data regarding the yield of 85 cows in their own College herd and 22 in another herd, a total of 104 "normal" lactations and 116 "infected". In some of these cases, the cows became infected during the study and a comparison was therefore possible of the yield before and after infection. Four tests for mastitis were used and the results are given as based on the composite results of these tests, and on the result of each individual test.

Corrections were made for age, length of lactation and number of daily milkings. As judged by the composite result of the four tests, mastitis caused a loss of 6.5 and 5% respectively in the two herds. With one infected quarter, the loss was negligible, but reached 12 and 11.2% respectively where all four quarters were involved. Based on the bromthymol blue test alone, the losses ranged from about 1% with one quarter reacting, to over 12% with four quarters reacting. Based on the leucocyte content or sediment content alone, losses were similar. Heavier losses are reported when the infection was diagnosed on the basis of the presence of *Streptococcus agalactiae* than when mastitis was diagnosed by a non-specific or indirect test. Staphylococci were associated with less severe losses.

About three quarters of the reacting animals showed a loss in yield, though some went through one or more infected lactations before the yield was reduced or the milk altered in appearance. Some cows showed a certain recovery in yield. Shortening of the lactation period was not observed nor any evidence of a reduction of fat.

The authors note that, whilst in these herds there was no rigorous culling of mastitis reactors, all acute and definitely clinical cases were eliminated fairly promptly and that, when surplus animals had to be disposed of, preference was given to mastitis reactors. They emphasize therefore that, the animals being mostly in the earlier stages of the disease, the actual reduction in yield in the average herd is probably much greater.

II. The first part of this article is concerned with the behaviour of the groups of mastitis and other streptococci from milk samples described earlier by the workers at Storrs, on the differential crystal violet-aesculin medium described by EDWARDS [*V. B.* 4. 303]. All of 92 cultures of *Str. agalactiae* produced characteristic grey-blue colonies with narrow zones of haemolysis: 19 cultures of streptococci previously described as *Str. pseudo-agalactiae* or group S<sub>1</sub> (both biochemically nearly similar to *Str. agalactiae*, but serologically different) produced either grey-blue colonies like *Str. agalactiae* or colonies which were brown due to splitting of the aesculin: all of 45 strains of *Str. uberis* (i.e., mastitis streptococcus Group III of Edwards) and all of 53 cultures regarded as saprophytes, produced brown colonies and browning of the medium.

The second part is concerned with the results obtained by plating on Edwards' medium 525 milk samples which showed streptococci after overnight incubation; 925 of the samples gave weakly haemolytic grey-blue colonies and 811 (95.7%) of this number proved by other tests to be *Str. agalactiae*: 78 gave non-haemolytic grey-blue colonies, and 74 (94.9%) of these proved to be *Str. agalactiae*. Further examination of 122 cultures which gave brown colonies showed that only 4.1% of these had the characters of *Str. agalactiae*. The authors conclude that Edwards' medium is about 95% efficient in separating *Str. agalactiae* from other streptococci

present in freshly drawn milk, and that for this reason, and because it facilitates the detection of *Str. agalactiae* even in the presence of large numbers of staphylococci, it is of definite value in the routine laboratory diagnosis of mastitis.

Finally, they describe a routine procedure for the detection of mastitis which is briefly as follows:—(1) "presumptive" tests, consisting of appearance of the sample, a bromthymol blue test, and a leucocyte count; (2) the incubation of 10 c.c. samples at 37°C. for 16-20 hours; (3) microscopic examination for streptococci; (4) surface plating on crystal violet-aesculin medium of all samples containing streptococci, and surface plating on this medium and also on plain cow blood agar (in order to detect other organisms such as *C. pyogenes*, staphylococci, *Bact. coli*, etc.), of all samples which were positive to the "presumptive" tests, but showed no streptococci in incubated milk samples; (5) examination of the plates after 24 hours', or preferably 48 hours', incubation, and (6) further identification of selected colonies, particularly where *Str. agalactiae*-like colonies are found in samples which were negative to the "presumptive" tests or in samples from previously uninfected cows. The animals are classed in five groups on the basis of these tests:—Group I, negative; Group II, positive to "presumptive" tests, but showing no streptococci; Group III, positive to "presumptive" tests and showing streptococci other than *Str. agalactiae*; Group IV, negative to "presumptive" tests, but showing *Str. agalactiae* or the so-called *Str. pseudo-agalactiae*, and Group V, positive to "presumptive" tests and also showing *Str. agalactiae*.

—A. W. STABLEFORTH.

MILLER, W. T., & JOHNSON, H. W. (1938). **Bovine Mastitis. The Relation of Streptococci to Physical Changes Occurring in the Udders of Dairy Cows.**

—*Amer. J. publ. Hlth.* 28. 1222-1230. 6 tables. [Numerous refs.]

Milk samples from 629 cows in nine herds were examined for streptococci, using:—(a) the so-called Hotis test, [*V. B.* 8. 555.], (b) microscopic examination of incubated milk, and (c) cultivation of incubated milk on horse blood agar plates. Streptococci were detected in milk samples from 298 (47.4%) animals belonging to five herds; no streptococcus-infected cows were found in the remaining four herds with a total of 82 cows. The incidence was highest in the largest herds.

Cultures were obtained from 276 of the 298 milk samples; the reactions of 230 of these cultures indicated that the organism was *Str. agalactiae* or, in a few instances, "closely related to it." [Twenty-six of the remaining 46 cultures fermented mannite and aesculin and reduced milk containing methylene blue in concentration of 1:10,000 (? Group III of MINETT, STABLEFORTH and EDWARDS).]

The udders of 617 cows were palpated for indurations after being milked out, and classified according to the plan described by UDALL and JOHNSON [*V. B.* 5. 594]. The results can be tabulated:—

Cows	Class 1 (free from induration— normal udders)	Class 2 (slight induration)	Class 3 (definite induration)	Class 4 (marked physical evidence of mastitis)
Infected ...	7	58	159	72
Non-infected	98	96	162	30
	<hr/> 45 (7.8%)	<hr/> 149 (24.1%)	<hr/> 321 (52%)	<hr/> 102 (16.5%)

The percentage of Class 4 cows found in the present enquiry is not considered abnormally high when compared with figures previously reported by the Bureau of Animal Industry. On the other hand, about 85% of the cows had good or reasonably good udders. In brief, from their observations in these herds, the authors conclude:—(1) that if streptococci were eliminated as causal agents a certain amount of mastitis would still be present, and (2) that clinical examination of the udder is valuable as a means of detecting cows which have or have had mastitis, irrespective of the cause, and of eliminating animals with badly diseased udders.

[While one would not disagree with the first of these conclusions, in the abstractor's opinion, the elimination of cows with chronic mastitis due to organisms other than *Str. agalactiae* on the basis of a clinical examination alone would sometimes be an unnecessarily wasteful procedure. A more important conclusion is that 60 out of 194 cows referred to in the table were excreting streptococci in the milk although clinically they had "normal or reasonably good" udders].—F. C. M.

- I. JOHNSTON, T. (1988). **Anatomical and Experimental Study of the Teat of the Cow with Particular Reference to Streptococcal Mastitis.**—*J. comp. Path.* 51. 69-77. 10 figs., 1 table. [11 refs.]
- II. FOOT, A. S., & SHATTOCK, P. M. F. (1988). **The Incidence of Mastitis in Cows Yielding Milk Low in Solids-Not-Fat.**—*J. Dairy Res.* 9. 166-173. 3 tables. [10 refs.]
- III. ROWLAND, S. J., & ZEIN-EL-DINE, M. (1988). **The Casein Number. A Chemical Method for Diagnosis of Mastitis.**—*Ibid.* 174-181. 1 fig., 3 tables. [8 refs.]
- IV. ROWLAND, S. J., & ZEIN-EL-DINE, M. **The Effect of Subclinical Mastitis on the Solids-Not-Fat Content of Milk.**—*Ibid.* 182-184. 2 tables. [2 refs.]

I. It is now generally accepted that under natural conditions pathogenic streptococci reach the udder tissue by way of the teat canal, but attempts to establish infection experimentally by the application of infected material to the end of the teat have frequently proved unsuccessful unless the closing mechanism was impaired or there was alteration in the duct, resulting from injury produced accidentally or experimentally.

The first part of J's contribution deals with the anatomical features of the teat, the second with certain experiments showing possible ways in which some of these features may predispose to infection. Amongst other things, it is shown that in some teats the lining membrane of the sinus shows a number of pouches, whilst in others there are folds which may even divide the teat into half, and that at the upper edge of the duct itself, the epithelium projects so as to form a kind of rosette around the opening into the sinus.

Experimental confirmation is given for the accepted fact that squeezing of the teat in milking must force milk from the teat sinus up into the lactiferous sinus or main ducts. An important finding, however, is that carbon particles which are milked through the teats tend to remain in the pouches, around the rosette and on any other irregularity or abrasion on the inner surface.

It is considered that a normal duct may be opened by the excessive pressure which occurs during over-stocking or, particularly in the case of the hind quarters, when the cow lies down or moves, and that such organisms, once having entered the udder, may be held effectively by pouches or abrasions as above. Since a normal duct of average dimensions, and a strong sphincter devoid of pouches and other irregularities, may be transmissible anatomical features, it is suggested that

these features may be responsible for the hereditary resistance suggested by one or two workers as existent in mastitis.

II. The authors conclude that when difficulty is experienced with milk which is low in solids-not-fat, one of the first steps should be to control clinical and sub-clinical mastitis.

It was found, in an investigation covering 29 herds with approximately 770 cows, that 19.5 % of the animals in milk during the first three months of 1987 were yielding milk low in solids-not-fat as estimated at two consecutive milkings. Of these cows (excluding those in which lactation was advanced) evidence of mastitis infection was found in 61.5 %. Re-examination of some cows suggested that the actual infection was probably about 70 %. About two-thirds of these infections were sub-clinical or latent and one-third clinically evident. Cows in the same herds giving milk which was normal or high in solids-not-fat were not examined for evidence of mastitis.

III. The authors investigated the value of a determination of the casein number  $\left( \frac{\text{percentage of casein nitrogen}}{\text{percentage of total nitrogen}} \times 100 \right)$  for the detection of chronic bovine mastitis (*Str. agalactiae* infection), using samples from 247 quarters of 62 cows; 49 % of the quarters and 74 % of the cows showed *Str. agalactiae* in the samples examined. Mastitis decreases the casein number by reducing the casein and at the same time increasing the albumin, globulin and proteose-peptone.

The total nitrogen content varied from 362 to 687.4 mg. per 100 ml., and the casein nitrogen from 153 to 554 mg., the casein number being 42.3 to 88.4. Samples from the uninfected quarters of Shorthorns, Friesians, Ayrshires and Guernseys gave, as average figures, 79.2, 80.4, 79.5 and 80.3 respectively; samples from infected quarters of the first three breeds gave 71.7, 74.1 and 70.3 respectively.

It is suggested that a figure of 78 or less should be taken as indicating an infected quarter. On this basis, the casein number test differed from the bacteriological in 21 out of 243 quarters, i.e., 8.6 %. It is pointed out that in certain cases the bacteriological test may have failed and that in any case samples giving 78 or about might perhaps be regarded as doubtful.

IV. Using the same samples of milk, the authors determined what correlation, if any, existed between the presence of mastitis streptococci (*Str. agalactiae*) and of a low solids-not-fat content (expressed as a percentage of fat-free milk).

The solids-not-fat figure for 114 uninfected samples varied from 8.24 to 10.28; 9 % of these were below 8.8 (the standard figure taken as corresponding to the legal presumptive minimum of 8.5 % for whole milk) and these averaged 8.56. On the other hand, the solids-not-fat figure for 121 infected samples varied from 4.26 to 9.92; 63 % were below 8.8 and these averaged 7.93. This effect of mastitis infection was found to be similar in the four common breeds. Looked at in another way, 88 % of the samples which were below 8.89 were infected, and it is concluded that sub-clinical mastitis accounts for a very high percentage of samples low in solids-not-fat.—A. W. STABLEFORTH.

SHERMAN, J. M. (1936). **Hemolytic Streptococci in Milk.**—*Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 95-104.

S. describes the four main types of streptococcus to be found in milk:—*Str. pyogenes* causing human infections, *Str. mastitidis* causing bovine mastitis, the haemolytic enterococcus type, which appears to be non-pathogenic, and an "animal pyogenes" which causes a variety of pyogenic infections in animals, but which does not so far appear to be pathogenic for man. Tests for the differentiation

of these streptococci are given. He also refers to other, intermediate types of streptococcus, besides those enumerated above; these are difficult to distinguish, and little is known about their pathogenicity. He suggests that at present some milk is condemned because of the presence of completely harmless haemolytic types, and that more work should be done on the differentiation of pathogenic from non-pathogenic streptococci.

- I. MILLER, W. T. (1936). **The Pathological Changes in the Udders of Cows with Marked Physical Cases of Mastitis.**—*Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 221-226.
- II. KLEIN, L. A., KLECKNER, A. L., & SCHEIDY, S. F. (1938). **Str. agalactiae Infection in Heifers Prior to Parturition.**—*Vet. Ext. Quart. Univ. Pa.* 38. No. 70. 3-9. 1 appendix. [7 refs.]

I. M. gives a detailed account of the histopathology of infected udders, examinations being carried out on udders from cows condemned for marked clinical mastitis. Pathological changes were found to be extremely varied, but were not usually striking; out of 1,216 quarters examined by M., only 12 were found to contain true abscesses or purulent foci. Usually it was observed that the inter-alveolar tissue had become hypertrophied, compressing the alveoli and was filled with fibroblasts, round cells singly and in clumps, polymorphs and some eosinophiles. In the majority of the sections examined, there was little sign of acute inflammation, such as haemorrhage, oedema, or increased vascularity of the part.

II. Swelling of the udder occurred in a group of ten heifers which when examined were six months in calf. The animals were under observation for four months. The affected quarters were not hot or painful; beta-haemolytic streptococci were being excreted from six of the animals when first examined, but had disappeared from all except one of these in the ensuing six weeks.

The authors speak of severe mastitis in the herd when these heifers were born, and suggest this may have led to infection.

- I. BREED, R. S. (1936). **The Significance of the Cell Count in Milk.**—*Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 205-211. 2 figs.
- II. HUCKER, G. J. (1936). **The Significance of Cell Count in Milk.**—*Ibid.* pp. 213-220. 5 tables.

I. This article consists of histological notes on the normal secreting udder. In B's opinion, "body cells" is a more accurate term to use in speaking of the cell count in milk than either "pus", "leucocytes", or merely "cells". Body cells found in milk are commonly due merely to normal tissue wastage, and do not mean that the udder is infected.

II. Epithelial cells in milk only indicate abnormality when in excessive numbers. A significant cell count (leucocytes and other cells) would be 500,000 per c.c. for milk from a single quarter, or 100,000 per c.c. for can samples. He considers that the cell count is a severe test, and should be used with discretion as a test for mastitis. The count tends to be higher in machine-milked than in hand-milked cows.

- I. MORRILL, C. C. (1938). **A Histopathological Study of the Bovine Udder.**—*Cornell Vet.* 28. 196-210. 8 figs. on 4 plates, 2 tables. [9 refs.]
- II. FERGUSON, Jean. (1938). **The Distribution of the Mastitis Streptococci in Dairy Herds.**—*Ibid.* 211-220. 3 figs., 3 tables. [10 refs.]
- III. GIBBONS, W. J. (1938). **The Histopathology of Mastitis. A Preliminary Report.**—*Ibid.* 240-249. 9 figs.

I. M. studied the histopathology of the mammary glands of 20 cows and

heifers most of which were affected with mastitis: 15 were in some stage of lactation, two were in the dry stage and three had never lactated. The histological state of each group is discussed briefly, and explanations of the origin of corpora amylacea, and of their presence in intralobular connective tissue in some instances, are suggested.

The most common lesion was an exudation of polymorphonuclear leucocytes, but productive changes in the stroma were nearly as frequent. The so-called sub-acute interstitial mastitis, characterized by numerous lymphocytes and macrophages, was much less frequent. Marked vacuolar degeneration of the alveolar epithelium was present in many areas, especially those showing exudation of polymorphs. Chronic productive changes are believed to affect the quantity of the secretion more often than the quality, owing to replacement of the secreting elements. Alterations of secretion were most marked in areas showing recent acute inflammation. The changes were on the whole much greater and more frequent in the lower planes of the quarter, support being thus given to the belief that infection occurs *via* the teat canal. As a result of the study, streptococcal mastitis is looked upon as a chronic and insidious but unmistakably progressive process disposed to occasional acute exacerbations; in these, progression may be wide and rapid, resulting in wholesale destruction of glandular tissue.

In two cows in which milking was suddenly stopped 8 or 9 days before slaughter, there was a wide-spread and recent extension of the inflammatory changes in the infected quarters. Another point of some interest is that of the quarters which showed decidedly chronic processes or productive changes, nearly all also showed evidence of recent acute changes in certain areas. Of the 60 quarters of the 15 cows in lactation, 37 had shown streptococci, but in 23 none had been found [method of examination not given].

Two blocks, one for frozen sections and the other for paraffin sections, were prepared from each of 18-39 areas in each adult animal, and from a smaller number of areas in heifers. Supramammary lymph nodes were also examined.

II. Quarter milk samples from all cows in 18 herds were examined for the presence of streptococci, 0.1 c.c. of fore milk being plated in deep horse blood agar. Of the total 655 animals in these herds, 21% showed streptococci. Of 229 infected quarters in these animals, 70% showed *Str. agalactiae*; 7%, *Str. dysgalactiae*; 10.8%, *Str. uberis*; 5.6%, streptococci of other kinds, and 6.5% unidentified streptococci. The author states that the streptococci referred to as *Str. dysgalactiae* and *Str. uberis* are those originally described by MINETT, STABLEFORTH and EDWARDS [V. B. 2. 588.] as "mastitis streptococci Groups II and III" respectively.

The extent of infection varied widely in the different herds. No streptococci were found in one herd. Seven herds showed only streptococci other than *Str. agalactiae*—usually *Str. dysgalactiae* or *Str. uberis*—and in these herds the infections were few in number and apparently sporadic; small numbers of these infections also occurred in herds infected with *Str. agalactiae*. The remaining ten herds showed animals infected with *Str. agalactiae*, and in these it was the predominant organism and the incidence of infection was high (16-77%).

As regards haemolysis nearly half the strains of *Str. agalactiae* yielded the usual narrow zone kind, a few were of the kind that produce wide zones with hazy edges, and the remainder produced non-haemolytic or green types; only one kind of haemolysis was present alone or in marked predominance in any given herd.

A table is given showing the reactions of the various streptococci in an extensive series of biochemical tests: the view being supported that use of the blood agar plate followed by tests in aesculin, sodium hippurate and litmus milk is a valuable method for the prompt identification of mastitis streptococci.

III. G. begins by a short description of the anatomy and histology of the normal glands, following this by details of the changes found in various stages or kinds of mastitis. He classifies these as follows:—thelitis, or inflammation of the teat, which results from injury or lesions caused by various diseases and predisposes to mastitis; acute catarrhal galactophoritis, which is usually a transitory stage of the extension of inflammatory changes, and the following forms of mastitis proper, *viz*, acute parenchymatous, acute suppurative, acute gangrenous, chronic productive and those specific forms found in tuberculosis and actinomycosis.

The most common lesion is a progressive chronic inflammation initiated by a mild parenchymatous inflammation or by one or more attacks of an acute nature. Microscopic studies are held to support the view that infection takes place through the teat canal, the oldest and most chronic lesions being usually found adjacent to the cistern or near the large collecting ducts, indicating "spread of the infection upwards by continuity". Chronic productive changes and mild parenchymatous changes were often found in various parts of the same infected quarter. The normal and morbid histology of the gland is held to indicate "the futility of treatment in anticipation of a complete cure and that the control of the disease therefore lies in prevention".

[It is probably safe to assume that the lesions here referred to were usually of streptococcus origin. The value of G's further studies will be greatly enhanced if the nature of the causal agent is correlated with the histological picture].

—A. W. STABLEFORTH.

MEŽAKS, P. (1938). O vospalenii vjimeni u korov. [**Bovine Mastitis**].—*Protokol. III. Vet.-Kongr. Balti. Staaten, 1937*. pp. 57-59.

Of the forms of bovine mastitis occurring in Latvia, "parenchymatous mastitis" [presumably streptococcal] is the most common: the clinical character and treatment are briefly described.

Mastitis of tuberculous, actinomycotic and botriomycotic origin are rare in Latvia.

STONE, Doris M., & GRAY, J. D. A. (1937). **Further Investigations on Non-Caseous Lymphadenitis in Imported Lamb and Mutton**.—*Med. Offr.* 58. 175-177. 1 table. [2 refs.] [See also *V. B.* 6. 97].

The authors isolated a streptococcus from the lymph nodes of carcasses of imported sheep affected with "non-caseous lymphadenitis". They were able to reproduce the lesions in three experimental lambs and in laboratory animals, and recovered the organism from the local lymphadenitis so set up. All the experimental lambs had footrot and an enterococcus was isolated from the lymph nodes draining the feet.—M. F. BENJAMIN.

HENRY, M. (1936). **A Further Note on the Incidence of Anthrax in Stock in Australia**.—*Aust. vet. J.* 12. 285-289. 2 tables. [1 ref.]

In a previous paper [(1922). *J. roy. Soc. N.S.W.* 56. 54.], H. emphasized the remarkable freedom of Australian wool from anthrax spores, and traced the history of anthrax in Australia from the first reported case in 1851 to the year 1921. It was then shown that, of all the States of the Commonwealth, the disease occurs only in New South Wales and Victoria, the extent of infection being much less in the latter. Further records for the years 1921 to 1936 are produced and are discussed under the headings of annual incidence, seasonal incidence, localization, mortality, areas of country involved in outbreaks, and vaccination. The majority of outbreaks occur in a comparatively small area in New South Wales, and the

approximate average annual mortality in that State from June 30th, 1924 to June 30th, 1936 (excluding 1930-1931, for which figures were incomplete) was 1,287 sheep, 21 cattle, 1.3 horses and 1.2 pigs. In 1930 an outbreak was considered to be traceable to the transference of infected soil which was carried in a dust storm from an infected to a hitherto anthrax-free area in N.S.W.

H. remarks upon the misleading statement in HUTYRA and MAREK's "Special Pathology and Therapeutics of the Diseases of Domestic Animals" which, in the 1926 edition, placed the loss of sheep in Australia from anthrax at 300,000 *per annum*. [The 1938 edition states that anthrax still causes considerable damage in Australia. It must be realized, however, that a loss of even 2,000 sheep *per annum* from a total exceeding one hundred million is really small].—T. S. GREGORY.

HEGYELI, Z. (1937). A Bac. anthracis virulentiájának fokozása és gyengítése táptalajokkal. [**Cultural Exaltation and Attenuation of *Bacillus anthracis***].—*Allatorv. Lapok*. **60**. 17-19.

H. states that avirulent strains of anthrax used for vaccines can be changed to virulent, capsulating strains with immunizing power, by 5-10 successive inoculations into broth mixed with an equal quantity of amniotic fluid, followed by 1-5 sub-cultures in ordinary broth (pH 7.4), or better, in broth with a base of fresh egg-white. Also, if anthrax bacilli of high virulence are passaged many times (100-150 if necessary) through ordinary broth or broth containing spleen extract, and then through swine blood serum, they are attenuated in such a degree as to yield a good strain for vaccine. A lessening of virulence likewise occurs when the anthrax cultures, after development in the above-mentioned culture media, are stored for a considerable time in an incubator, the cultures being reinoculated on ordinary agar cultures every ten days.—G. SÁLYI (BUDAPEST).

KUJUMGIEFF, I. (1938). Il prontosis quale mezzo di differenziazione del *Bacillus anthracis* dai germi saprofiti similcarbunciosi. [**Differentiation of *B. a.* and *B. pseudo-anthraxis* by Growth in Prontosil Added to Culture Broth**].—*G. Batt. Immun.* **20**. 1010-1017. [11 refs.] [English, French and German summaries].

During some experiments with prontosis, K. found that when 2-3 drops of [? undiluted] prontosis were added to broth cultures of *B. pseudo-anthraxis* the red colour which immediately forms disappeared completely after 48 hours' incubation; the colour persisted, however, for 4-7 days in broth cultures of *B. anthracis*.

—J. A. NICHOLSON.

SFORZA, M. (1938). Ricerche sul comportamento della vaccinazione anticarbunclosa con carbozoo in bovini affetti da piroplasmosi, tripanosomiasi e peste bovina. [**The Effect of Vaccination against Anthrax with Carbozoo on Cattle Affected with Piroplasmosis, Trypanosomiasis and Rinderpest**].—*Clin. vet., Milano*. **61**. 291-305. [6 refs.]

From experience in Eritrea, S. concludes that anthrax vaccination can be applied to cattle which are infected with trypanosomes or piroplasms, provided that they are not acutely ill at the time. The progress of a fresh trypanosome infection appeared to be accelerated by anthrax immunization, though it did not lead to death.

The carbozoo vaccine should not be used during a rinderpest outbreak.

- I. RITTER, H., & NOTHDORFF, G. (1938). Serologische Milchuntersuchungen im Rahmen des Tuberkulosebekämpfungsverfahrens aus den Jahren 1933-1936. [*Serological Milk Tests Carried out in the TB. Control Scheme in Germany from 1933-1936*].—*Zlb. Bakt. I. (Orig.)*. **141**. 171-186. 8 tables. [Numerous refs.]
- II. TREML, F. (1937). Tilgung der Tuberkulose des Rindes. [*Control of Bovine TB. in Czechoslovakia*].—*Prag. tierärztl. Arch.* **17**. 171-175.
- III. PRÖSCHOLDT. (1938). Ueber die Bedeutung der Tuberkulinprobe für die Diagnose und Tilgung der Rindertuberkulose. [*Importance of the Tuberculin Test for the Diagnosis and Eradication of Bovine TB.*]—*Ibid.* **18**. 85-98.
- IV. ROLLE, M. (1938). Ueber die Bekämpfung der Rindertuberkulose. [*Control of Bovine TB.*]—*Protokol. III. Vet.-Kongr. Balti. Staaten, 1937*. pp. 33-37. [In German].

I. During the years 1933-1936 inclusive, 20,000 samples of milk, some single samples from each cow, others quarter samples, were examined by the complement-fixation test, for the performance of which a shortened method is described. The test was found to be specific and of value in detecting udder TB. Occasional false negative results (12 out of 14,011) were encountered, and were considered to be due to the temporary loss of demonstrable antibodies. A negative serological test, however, was considered to rule out the possibility of the presence of *Mycobacterium tuberculosis* in the milk, and thus to render unnecessary microscopic and biological tests on, in this series, 94% of the samples. A positive test was not related to the presence of tubercle bacilli in the milk, and merely indicated that further tests should be applied for the demonstration of the organism. Up to 9.4% of the serologically positive but clinically negative cows, and up to 30% of the serologically positive and clinically suspicious, were found to be excreting the bacillus.

II. It is calculated that the degree of infection from TB. in Czechoslovakia [1937] was as follows:—cows, 18.1%; bulls, 3.5%; oxen, 22.5%; young cows (1-2 years), 13.0%, and calves, 9.3%. From these figures, the total number of animals infected is said to be 667,000 out of 4,800,000 head of stock. As a control measure, the building up of clean herds by means of the tuberculin test is advocated; it is pointed out that eradication is a matter in which all types of veterinary and agricultural workers must co-operate, and for which state aid is essential together with increased prices for milk from herds free from infection.

III. The various methods of tuberculin testing are described, and the intradermal advocated as the routine test. Of 30,000 animals examined, 50% of the cows, 40% of the bulls, 30% of the young animals and 14% of the calves gave positive reactions. The procedure to be adopted and the measures to be taken to eliminate TB. from a herd are discussed.

IV. There appears to be considerable difference in the interpretation of the single intradermal tuberculin test as it is performed in different countries. Some consider an increase of 3-4 mm. in the skin thickness to be positive, others that any increase less than 7 mm. is negative.—P. S. WATTS.

ALEKSA, K., & KAŽYS, J. (1938). I galviju tuberkulozės paveldėjimo klasima inašas. [*TB. and Heredity*]. pp. 46. Numerous tables, 2 charts. [Numerous refs.] [In French pp. 27-46]. Kaunas: Akc. "Spindulio" B-vės spaustuvė. [8vo].

This booklet gives the results of many years' observations on a large herd of cattle, and their breeding record and history with regard to TB. are shown in

tabular form. In general, no strong evidence for or against the inheritance of susceptibility to TB. was obtained: in some cases it appeared that there was such inheritance and in other cases none could be demonstrated. The tables give much interesting information.—A. PABIJANSKAS (KAUNAS).

SCHÜRMANN, E. (1987). Die Fleischschau im Dienst der Rindertuberkulosebekämpfung. [**Contribution of Meat Inspection Work to the Control of Bovine TB.**]—*Tierärztl. Mitt.* **18**, 291-292.

S. reports that Ostertag's method for the eradication of TB., and the compulsory slaughter of open cases, has proved a failure in Germany. To assist a scheme for the eradication of TB. by tuberculin testing and compulsory slaughter of all reactors, he suggests that animals in the abattoirs found to be infected with any form of TB. should be traced back to the herd from which they originate, so that appropriate measures may be taken there.—M. F. BENJAMIN.

I. ANDERSSON, N. (1988). Hudtuberkulosen inom Hemse veterinärdistrikt. [**"Skin Tuberculosis" ("Skin Lesions in Tuberculin Reacting Cattle") in the Veterinary District of Hemse, Gotland, Sweden.**]—*Svensk VetTidskr.* **43**, 8-11. 1 table.

II KRANTZ, G. T. (1988). Om s.k. hudtuberkulos hos nötkreatur. [**On the So-Called Skin TB. of Cattle.**]—*Skand. VetTidskr.* **28**, 1-26. 2 figs., 1 table. [44 refs.] [English summary].

I. By about 1920, bovine TB. was regarded as eradicated in the district, and in consequence, very few tuberculin tests were performed from then until 1980. After that year, when testing was started again, a certain percentage of herds contained reacting animals. In 1985 and 1986, practically all herds were tested and reacting animals slaughtered, but in 1987, 25.6% of herds still contained reactors. This was thought to be due partly to the very prevalent TB. in human beings and partly to the incidence of the infection in poultry. In 1986 and 1987 attention was first turned to the "skin tuberculosis" described in America, and generally called "skin lesions".

It was observed for the first time in Hemse in 1980, and in 1986 reactions caused by this condition occurred in 59 herds. Large numbers of reactors were found in groups of neighbouring farms. No clinical disturbances were observed. Nodules were found in the subcutaneous tissue of the legs, but very seldom on the neck, chest or trunk; nodules were sometimes found in rows, apparently along lymph vessels. It seems as though well pronounced nodules can disappear again after a month or so. Abscess formation followed by discharge of pus and disappearance of the lesion is also encountered. Sometimes a number of new nodules develop around such a lesion.

A. believes that the "skin lesion" cases observed by him are infectious, as they appeared as an epizootic. The disease causes no severe symptoms in the animals and many cases seem to recover. New infections can appear after the segregation of all reacting animals in a herd. Cattle infected with avian or human types of tubercle bacilli are retained in the herd; search is made for the source of infection in the fowls in contact or in the personnel and it is removed. A. suggests that skin lesion cases should also be kept in the herds.

II. After a review of the literature K. describes 40 cases of this condition found on the island of Gotland. The lesions were, as a rule, localized in the subcutaneous tissue of the lower part of the legs, and of the ventral aspect of the abdomen and chest. In 32 cases the regional lymph nodes were examined, and in 12, changes resembling these of TB.—as a rule fresh epithelioid tubercles

containing Langhan's giant cells—could be demonstrated microscopically. Acid-fast bacilli were found in subcutaneous nodules from 85 cases and in adjacent lymph nodes of seven. As a rule, the rods were somewhat shorter than ordinary bovine tubercle bacilli, and frequently had lumpy ends; acid-fast granules were often met with. All 40 animals reacted to the tuberculin test, 39 to the intradermal and one to the subcutaneous test. In 11 animals alterations could be detected clinically by palpation of the skin. Inoculation of material from nodules into g. pigs and rabbits failed to set up infection. No growth was obtained on Löwenstein's or Besredka's media. It seems most probable that infection was acquired through the skin.—H. E. BENDIXEN (COPENHAGEN).

BAREGGI, G. (1938). Contributo alla conoscenza della endocardite nei bovini tubercolotici. [**Endocarditis in Tuberculous Cattle**].—*Pat. comp. Tuberc.* 4. 64-76. 8 figs. [Numerous refs.] [English, French and German summaries].

In cattle with generalized TB. there are sometimes nodular lesions on the heart valves, usually accompanied by pericarditis. Twenty such cases were examined. The tricuspid valves were more commonly affected, and the lesions were usually more prominent on the auricular surface of the valve. In early lesions there was a small cavity containing blood; in older lesions the cavities contained amorphous material from the breakdown of the blood corpuscles. The lesions had increased in size, largely as a result of a connective tissue proliferation, until large vegetations were formed. B. suggests that they were presumably the result of the toxic action of the tubercle bacilli.—J. A. NICHOLSON.

- I. MILLS, M. A., GUNN, F. D., & BARTH, E. E. (1938). **Experimental Pulmonary Tuberculosis in the Dog**.—*J. Bact.* 35. 458.
- II. MÉRY, F. (1938). Les dermo-tuberculides ou tuberculoses vraies de la peau chez le chien. [**Tuberculous Lesions of the Skin in Dogs**].—*Bull. Acad. vét. Fr.* 11. 234-240.

I. Of common laboratory animals, the dog is considered most similar to man in relative resistance and type of lesions produced. Pulmonary lesions were produced in dogs by intrabronchial instillation (using a bronchoscope) of suspensions in mucin of living virulent human and bovine types of tubercle bacilli. Clinical studies made included blood counts, sedimentation rates, cutaneous tuberculin tests and X-ray examinations. The appearance of lesions depended more upon individual susceptibility than upon the dosage. Skin sensitivity arising from active infection occurred by the fifth to seventh day and persisted, becoming negative only in cases with rapidly progressing or advanced TB.

II. M. describes four cases in dogs. Diagnosis was confirmed by microscopic examination, complement-fixation tests, or g. pig inoculation. In these cases there were no associated reactions in the lymph nodes and no discoverable lesions of organs or viscera on P.M. examination. The bacilli were apparently attenuated, and M. suggests that they may have been of human type, though it was not possible to investigate this matter.—S. J. GILBERT.

GIANFRANCESCHI, G. (1937). Vaccin antituberculeux étudié sur les animaux de laboratoire (lapins, cobayes). [**Laboratory Tests of a Vaccine against TB**].—*Boll. Soc. ital. Soc. int. Microbiol.* 9. 196-200. [In French].

G. describes the preparation of a vaccine which is considered to confer good immunity. It is said that by means of several passages through g. pigs of a mixture

of *Bact. coli* and the tubercle bacillus, the former developed a capacity to invade the latter.—S. J. EDWARDS.

HOLMES, M. J. (1937). **Tuberculosis in Australia.**—*Med. J. Aust.* Nov. 6th. 818-827. 11 tables, 7 graphs. [10 refs.]

Referring to infection in man by the bovine type of TB., H. states that in Australia the death rate in children is probably the lowest in the world. Nevertheless, the morbidity produced in children is by no means inconsiderable. The infection is practically confined to children under 15 years of age, affecting chiefly the tonsils and cervical and mesenteric lymph nodes; bones and joints appear rarely to be affected. H. strongly recommends that dairy herds should be tuberculin tested and reactors eliminated, and that milk should be pasteurized.—T. S. G.

I. WHITE, C. (1937). La situation actuelle des états-unis d'Amérique en ce qui concerne la tuberculose humaine d'origine bovine. [**Human TB. of Bovine Origin in the U.S.A.**].—*Bull. Off. int. Hyg. publ.* 29. 1649-1652.

II. PETRAGNANI, G. (1937). Sur la tuberculose humaine d'origine bovine en Italie. [**Human TB. of Bovine Origin in Italy**].—*Ibid.* 1653-1655. [1 ref.]

III. LANGE, B. (1937). Perlsuchtbazillen als Erreger der Lungenschwindsucht. [**Bovine Type Bacilli as the Cause of Pulmonary TB. in Man**].—*Dtsch. med. Wschr.* 63. 1465-1469 and 1506-1508. 8 tables. [Numerous refs.]

IV. OESTERREICH, E. (1937). Ueber prozentuale Häufung der mesenterialen Primärkomplexe bei der Landbevölkerung und ihre Erklärung durch die Milchbewirtschaftung. [**The Frequency of Mesenteric Primary Complex in Country TB. Patients, and its Connexion with Dairy Farming**].—*Beitr. Klin. Tuberk.* 89. 128-134. [9 refs.]

V. KETZ. (1938). Der heutige Stand der Forschung über die Bedeutung des bovinen Tuberkelbazillus für die Lungenschwindsucht des Menschen. [**The Present Position of Research on Human Pulmonary TB. Caused by the Bovine Type of Bacillus**].—*Berl. tierärztl. Wschr.* June 10th. 934-935.

I. Human TB. of bovine origin is stated to be very rare in the U.S.A. and only nine cases are mentioned here, out of 227 cases of non-pulmonary TB. investigated. Practically all milk sold in towns is pasteurized, but in rural districts about 40% of consumers take milk raw; this carries little risk, however, owing to the rarity of TB. in cattle.

II. P. states that in Italy cases of human TB. of bovine origin are rare, and cites some ten cases described since 1918. Brief reference is made to the control of bovine TB. and to the isolation of tubercle bacilli from suspected material.

III. A general review of the subject, with quotations from the literature. Between 1927 and 1937, L. investigated 171 cases of TB. in adult human beings, and found bovine type infection in nine and human plus bovine type infection in three cases. He estimates that 25% of all cases of TB. in adults among country dwellers in Germany are due to bovine type infection, and stresses the need for a new bovine TB. eradication scheme.

IV. Of 508 cases of human TB. in rural areas found at autopsy at Griefswald Pathological Institute, 102 (20%) showed mesenteric primary complex, which is ascribed to infection from cows' milk in country dwellers. No bacteriological differentiation was carried out to verify the origin and type of infection.

V. A brief review of some recent literature, with special reference to reports by GOETERS [*V. B.* 8. 625.] and LANGE [in III, above].—J. E.

LIGETI, M. (1984). A glycerin szerepe és a malachitzöld alkalmazásának jelentősége a bovin-típusú gümöbácillus tenyésztésénél. [**Glycerin and Malachite Green in Media for the Isolation of Bovine Type Tubercle Bacilli**].—*Közl. Oesszehas. élet- és kortan Kórébél.* 26. 189-198. [Numerous refs.]

Hohn's, Löwenstein's, Petraghani's and Sweany and Evanoff's media were very suitable for the cultivation of tubercle bacilli obtained from 82 infected organs of cattle. The organisms grew best on media free of glycerin, and whereas the cultures on Löwenstein's and Petraghani's media grew in 29% of the tests, the same culture media without glycerin gave growth in 65%. Malachite green had a strong inhibiting effect on the development of contaminating bacteria, for when the experimental material had previously been treated with 8% sulphuric acid, saprophytes developed in only 18% of cases on Petraghani's medium containing malachite green, but in 82% on Sweany-Evanoff medium without malachite green.—G. SÁLYI (BUDAPEST).

SARNOWIEC, W. (1988). Influence du bacille de Koch sur le bacille de Bang *in vitro*. [**Influence in vitro of Mycobacterium tuberculosis on Brucella abortus**].—*Ann. Inst. Pasteur.* 60. 651-660. 3 tables. [7 refs.]

According to the authors, the cultivation of *Br.a.* in the presence of tubercle bacilli (human or bovine type) results in some change in the brucella, rendering it more virulent and able to stimulate stronger serological reactions. Other changes are also claimed, including the ability of the brucella to produce pro- and mid-zone effects if used for the agglutination test. [Such zone effects are occasionally noted when the sera of cattle are tested for contagious abortion by the aggl. test].

—E. J. PULLINGER.

McKENNEDY, F. D., & SHILLINGER, J. E. (1988). **Transmission of Pasteurella Cuniculicida [Past. lepiseptica] in Rabbits by Breeding.**—*J. Amer. vet. med. Ass.* 93. 161-164. 1 table.

Investigation of the breeding record of a male rabbit revealed that many of the does mated to him died of haemorrhagic septicaemia in 6-12 days. Other does so mated developed a purulent metritis and vaginitis and sterility, and died after varying periods. The male rabbit was found to have an abscess of one testicle, resulting from *Pasteurella lepiseptica* infection.

Experiments demonstrated that infection of females from the infected male could be produced without difficulty by mating, but not by ordinary contact in the same cage.—D. D. OGILVIE.

DE ARAUJO, E. (1987). Gatos e peste bubónica. [**Cats and Bubonic Plague**].—*Hosp., Rio de J.* 12. 769-778. [Copied verbatim from *Trop. Dis. Bull.* 35. 210. Signed W. F. H.]

Cats are susceptible experimentally to plague by cutaneous (with scarification), subcutaneous and conjunctival (with or without scarification) inoculation. It was not found possible to infect cats by feeding them with plague spleen and it would seem that natural plague could only be contracted by them through food, if trauma of the mouth or intestinal mucosa took place.

RUDESILL, C. L. (1987). **Tularemia from the Bite of a Nursling Kitten.**—*J. Amer. med. Ass.* 108. 2118.

A woman was infected with tularaemia by one of two kittens of a cat which had caught and eaten a rabbit a few days before. The kittens died, but the cat recovered.—J. E.

GARD, S. (1987). Ein Colistamm mit Salmonella-H-Antigen, zugleich ein Beitrag zur Frage der Definition der Salmonellagruppe. [A Strain of *Bacterium coli* with Salmonella H Antigen, and a Contribution on the Problem of the Definition of the Salmonella Group].—*Z. Hyg. InfektKr.* 120: 59-65. [Copied verbatim from *Bull. Hyg., Lond.* 12. 905. Signed W. W. TOPLEY].

There is, today, agreement among most bacteriologists that antigenic analysis is an extremely valuable method of type-differentiation within the Salmonella group, and many would support the view that the primary classification of the group should be made on this basis. This view, as the author points out, has been strengthened by the discovery of Salmonella strains that depart, in important fermentative characters, from the behaviour of the group as a whole—indole-forming strains of *Bact. eastbourne*, gelatin-liquefying strains of *Bact. dar-es-salaam*, or of *Bact. abortus equi*, and so on.

It is of importance, therefore, to note any instance in which antigenic components of the Salmonella group are shared by unrelated species or types. The author describes a strain of *Bact. coli*, isolated from the faeces of a case of clinical typhoid fever with perforation and haemorrhage, which possessed flagellar antigens containing components commonly found in the group phase of the diphasic Salmonellas. Cross-absorption experiments showed that the strain in question possessed the H components 1, 8, 4 and 5 of the Kauffman-White classification, together with an additional component, or components, not represented in the known diphasic Salmonellas. This strain of *Bact. coli* was itself found to be diphasic; and in the alternative phase the H antigens showed no relationship to any of the specific or group H antigens of the known Salmonella strains.

The O (somatic) antigens of this strain of *Bact. coli* showed no relation to any Salmonella O antigen.

VAN DORSSEN, C. A. (1987). Infektionsversuche mit Salmonella enteritidis var. dublin an jungen Hunden. [Experimental Infection of Puppies with *S.e. var. dublin*].—*Z. Veterinärk.* 49. 419-428. 2 tables. [Numerous refs.]

The author gives a brief summary of the literature on the subject, and describes the experimental infection by ingestion of three six-week-old puppies. By the third day the animals were dull and affected with diarrhoea, but soon recovered. When they were killed three weeks later, the organism was isolated only from the mesenteric lymph nodes. Faeces culture was positive up to five days after infection. The sera agglutinated *S.e. var. dublin* at from 1 : 200 to 1 : 400.—D. SLAVIN.

HART, L. (1986). An Examination of Sixty-Four Strains of Salmonella Sp. Isolated from Poultry in New South Wales.—*Aust. vet. J.* 12. 238-235. [6 refs.]

Three strains were obtained from the ovaries of hens and 61 from young chickens showing symptoms of pullorum disease. The fermentation reactions of all the cultures were those of *S. pullorum*. The failure of all the cultures to ferment maltose and dulcitol indicated the absence of *S. gallinarum*. As the material was collected from wide-spread outbreaks, it seems probable that *S.g.* infection does not occur in New South Wales.—T. S. GREGORY.

VILLANI, S. (1987). Sulla recettività di alcune specie di volatili all'infezione Sperimentale da *B. pullorum*. [Susceptibility of Wild Birds to Salmonella pullorum Infection].—*Profilassi.* 10. 148-150. [11 refs.]

The author tested the susceptibility of various domestic and wild birds

to artificial infection with *S.p.* The virulence of the strain was first determined by subcutaneous inoculations into pigeons. Pheasants, finches, sparrows, turkeys, geese, ducks and doves were readily infected, death following within 24 hours. In every case it was possible to recover the organism from the heart blood. The lesions varied, but there was always an intense enteritis and diarrhoea and sometimes congestion of the lungs and pleura, fatty degeneration of the myocardium, and enlargement of the liver, kidneys and spleen. Doves appeared to be the most susceptible. It is concluded that wild birds may suffer from a natural infection and can act as carriers of the disease. [The behaviour of the strain of *S.p.* used for the test doses appears to have been unusual. No comment is made by V. on the rapidity with which it caused death].—J. A. NICHOLSON.

- I. GRÄUB, E. (1937). Grundsätzliches zur Frage der Bekämpfung des seuchenhaften Verwerfens. [Control of Bovine Brucellosis in Switzerland].—*Schweiz. Arch. Tierheilk.* 79. 20-26. [1 ref.]
- II. ROOTS, E. (1937). Ueber die Bekämpfung der Brucellose. [Control of Bovine Brucellosis].—*Ref. III Balti. Valsty. vet. Kongr. 1937.* pp. 23-34. 2 tables. [In German: Russian summary].

I. Eradication is voluntary, and since 1935 has been government-subsidized both for the detection and removal of reactors and for their replacement by non-reactors. Spread of the infection in Switzerland has frequently been due to pasturing infected and non-infected animals together. It is to be noted in this connexion that for over 200 years, in one canton, turning an animal out to grass within six weeks of its aborting has been prohibited.

II. Immunization, chemotherapy and hygienic control are discussed. Dead vaccines are unsatisfactory; live vaccine is said to be excellent in that the tendency to abort is lessened, but to be dangerous, as it sometimes causes long-standing brucella infection of the udder with excretion of large numbers of organisms. This method has, therefore, been banned in Germany. Avirulent cultures are dangerous also because the organisms might regain virulence. Chemotherapeutic measures are of little value.

The best means is hygienic control either by isolation of reactors or by their removal from the herd. The animals should be tested every two months and reactors removed or isolated.—D. SLAVIN.

- I. MOORE, W., GRINNELL, C. D., & FAULHABER, L. J. (1937). **Bang's Disease in North Carolina.**—*Tech. Bull. N. C. agric. Exp. Sta.* No. 54. pp. 32. 27 tables. [7 refs.]
- II. MARTIN, W. E. (1938). **Observations on Bang's Disease.**—*J. Amer. vet. med. Ass.* 92. 560-562.
- III. ANON. (1938). Les brucelloses dans le monde. [Brucella Infection in Central Asia].—*Arch. internat. Brucelloses.* 1. 33-35. 1 table. [1 ref.]

I. This report covers eight years' work, in 25 herds, on the control and eradication of contagious abortion by means of the agglutination test. The results were generally very successful. The farms controlled were well isolated from adjacent herds, but the methods of control varied according to the facilities available. The tests performed in each herd are shown in tabular form, with descriptive notes in each case. The importance of the introduction of new cattle into infected herds in maintaining virulence and continuing the spread of contagious abortion is shown and also the self-limiting nature of the disease in herds in which no such additions or replacements are made. The results achieved enabled more rapid progress to be made, using tests of infected herds at 30-day intervals, complete

isolation, and better sanitation, while the presence of the negative herds inspired confidence and better co-operation.

II. M. is a practitioner in the State of Ohio, and in his district has always found contagious abortion to be a self-limiting disease and not of great practical importance. No abortion vaccines are used. He finds that his views vary greatly from those of other workers and presumes his experiences have been different. [On the three farms quoted as instances the disease seems to have been of a very low virulence. No exact figures are given, and no mention is made of sterility, etc.]

III. An abstract of studies on brucellosis published by the State Scientific Institute of Turkestan. *Brucella* infection was found to be wide-spread amongst local sheep and cattle. Examination of 1,151 human subjects in contact with these animals revealed a 10% infection. A relatively small proportion of shepherds were affected, and this has been attributed to the fact that they do not drink unboiled milk.—S. J. GILBERT.

MORRISON, H. B., & HULL, F. E. (1936). **Studies on Aseptically Drawn Milk from Bang's Disease Positive and Bang's Disease Negative Cows.**—*J. Dairy Sci.* 19. 432-433.

The authors applied the bromthymol blue reaction, leucocyte content count, agglutination reaction and examination for the presence of streptococci to 711 separate quarter samples from all the cows of two commercial dairies in Kentucky. At one dairy the brucella-infected group was kept in rigid isolation. The other dairy kept two herds; in one, isolation of brucella-infected animals was partially carried out, but no attempt at isolation was made in the other.

A comparison of all four tests at the same sampling showed that most of the brucella-positive cows were positive to all four mastitis tests and that most of the brucella-negative cows were negative to all four mastitis tests.

These results indicate the bearing which brucella infection may have upon the incidence of udder disease unless proper control and management are instituted.

—C. V. WATKINS.

GUILLERMO, LOCKART, P., & BERNINZONI, T. (1936). Profilaxis de la enfermedad de Bang. [Control of Bovine Brucellosis in Uruguay].—*Bol. mens. Direcc. Ganad., Montevideo.* 20. 22-31.

A general review of the great importance of bovine brucellosis in Uruguay and the need for adequate control measures. Investigations made in 1936 revealed that 650 out of 1,883 animals examined in the department of Montevideo were reactors, 81 out of 255 in the department of Canelones, 40 out of 92 in the department of San José, and 197 out of 363 in the Florida department.

The authors speak of general control and eradication measures, including necessary steps to obtain the co-operation of farmers.

ORLOV, E. S. (1937). O patogennosti *Brucella abortus bovis* glja svinej. [On the Pathogenicity of *Br.a.* for Pigs].—*Sovyet. Vet.* Nos. 11-12. pp. 69-73. 3 tables.

O. carried out experiments on 79 swine 1-11 months old. Fourteen were infected with small doses (two subcutaneously with  $10^5$  organisms, eight *per os* with  $10^6$ , and four into the conjunctiva with  $10^6$  organisms) and 65 with larger doses. There was a temporary increase in the agglutination titre, but abortin tests were negative, and no signs of illness appeared. Parturition was normal in three pregnant sows infected [no information given as to when infected].

Bacteriological and biological investigations of urine and milk of 68 of the infected animals did not reveal the presence of the organism, and no cultures could be obtained from the organs of animals slaughtered on the 50th and 85th days after infection.

O. considers that the pathogenicity of *Br.a.* for swine is insignificant, and that they cannot be agents in the spread of the infection.

TAYLOR, R. M., LISBONNE, M., VIDAL, L., & HAZEMANN, R. H. (1938). Quelques notes épidémiologiques sur l'infection des chèvres et des brebis par *Br. Melitensis*. [*Br.m. Infection of Goats and Ewes*].—*Rev. méd. vét., Toulouse*. 90. 185-205. 1 table, 5 maps. [8 refs.]

The persistence of brucella infection in ewes was investigated in 40 experimentally infected animals slaughtered after 5-72 weeks. Although all the ewes reacted positively to intradermal and agglutination tests before autopsy, *Br.m.* could be recovered from only eight cases, in two of which infection had persisted for 72 weeks.

Examination of the faeces, nasal discharge and urine of 46 naturally or experimentally infected ewes by g. pig inoculation revealed the presence of brucella in two urine samples from recently aborting ewes with positive vaginal cultures. In 65 ewes, the vaginal discharge ceased to be infective after 26 days. Excretion of brucella in the milk ceased within two months of abortion in 53 ewes, and within ten months in all of a herd of 127 goats.

The authors conclude with a scheme of proposed control measures as follows:—divide migratory flocks into healthy and doubtful and prohibit contact between them; allocate pastures to these categories separately; transport the doubtful flocks by railway; supervise sheep sales; prohibit the transport of pregnant ewes, and delay lambing until flocks have been separated.—R. O. MUIR.

ROSATI, T. (1938). Di una localizzazione vertebrale della brucella melitensis nella pecora. [*Vertebral Localization of Br.m. in Sheep*].—*Azione vet.* 7. 339-342. 2 figs.

One of a flock of ewes in which abortion was prevalent developed paralysis of the hind-quarters 6 weeks after it had aborted. The agglutination test was negative, but a positive reaction was obtained with Mirri's brucellin. On slaughter, the only lesion found was an abscess between the second and third lumbar vertebrae. The abscess was covered by connective tissue and callus formation had taken place. At one point, however, the abscess entered the spinal canal, causing pressure on the spinal cord. *Br.m.* was isolated from the pus.—J. A. NICHOLSON.

TARASOV, I., & KOTLIAROVA, H. (1937). K harakteristike kultur brucell, vydelennyh ekspeditsiei VIEM v podopytnom ovcesovhoze. [*Characteristics of the Brucella Cultures Isolated on the Expedition's Experimental Sheep Farm*].—*Brucellosis in Sheep*. pp. 19-22. 2 tables. Moscow: Viem Publ. Dept.

The authors state that bacteriological studies of 90 brucella strains which were obtained mostly from aborted fetuses, and of two strains from human beings on the Experimental Sheep Farm in North Caucasus, showed that, with the exception of one of the human strains, all belonged to *Br. melitensis*. The exception was *Br. suis*, obtained from a farm hand who had come to the farm only a few days before the test, and who had previously worked on a pig farm in another locality. It was further proved that all the strains were highly virulent both to the sheep and to g. pigs. The *Br.m.* strain from man was isolated in 1938, and

after having been passed through a ewe, it proved in 1984 to be pathogenic both to g. pigs and to sheep, the minimum dose necessary to cause active infection in the latter being about 5,000 organisms introduced subcutaneously.

VERŠILOVA, P., & TARASOV, I. (1937). Brucelleznyje aborty u ovec i ih patogenez. [Abortion in Sheep, caused by *Brucella melitensis*, and Pathogenesis of the Organism].—*Brucellosis in Sheep*. pp. 69-93. 11 tables. Moscow: Viem Publ. Dept.

In the first series of the experiments described, 15 healthy, pregnant ewes were infected subcutaneously, at dates varying from one to three months after service, with a heavy dose ( $10^9$  organisms) of the virulent strain of *Br.m.* used constantly by the Brucellosis Commission to North Caucasus. Another ewe, also pregnant, was given  $2 \times 10^{10}$  bacteria of the same strain *per os*. Of these ewes, one aborted on the tenth day after infection, two on the 15th, nine on the 30th, three on the 45th, and one on the 60th. The foetus of the first ewe did not yield *Br.m.* on bacteriological examination, but the dam, killed 15 days after abortion, was found to be infected. As a general rule, sowings from the aborted foetuses were positive, but a few proved sterile. Of the six aborting ewes killed and examined 5-45 days after abortion, *Br.m.* was only obtained during the first twenty days, indicating that examination of aborting ewes at later dates is not reliable for the diagnosis of brucellosis.

In the second series of experiments, 28 healthy ewes were injected (subcut.) with *Br.m.* 2-4 months before service, one four days before, and one on the day of service. The last-mentioned ewe aborted and *Br.m.* was later recovered from the foetus. The ewe infected four days before service produced a lamb which died within 24 hours, and from which *Br.m.* was also recovered. Of the 28 ewes, three were killed and examined during pregnancy; the rest, with the exception of two which aborted from traumatic causes, produced healthy lambs, indicating that infection before service did not interfere with normal gestation. Bacteriological examination of four of the delivered ewes, in addition to the three killed during gestation, resulted in the recovery of *Br.m.* from three of the seven. This recovery of the organism from animals infected 5-7 months previously does not support the findings in the first series of experiments. The authors considered it an indication of latent infection activated under the influence of pregnancy.

In the third series of experiments, 22 maiden ewes were infected (subcut.) with  $10^9$  *Br.m.* in July, 1934, and were served in the autumn of the same year; they were reinfected with the same brucella dose in February of the following year. Nineteen produced healthy lambs, demonstrating the immunizing effect of the first infection against reinfection with a massive dose of the organisms. Five of these ewes were examined bacteriologically 1-10 days after parturition, and *Br.m.* was obtained in only one case. When, however, eight ewes which had aborted following experimental infection, and eight more which had aborted as a result of a naturally acquired *Br.m.* infection, were subjected to similar reinfection during a second pregnancy, four aborted brucella-infected foetuses, and four produced non-viable or dead lambs, from one of which *Br.m.* was recovered.

Two years' observations on the Experimental Farm showed that up to 20% of ewes which had once aborted did so again during the following pregnancy, and that a further 28% produced non-viable lambs, both as a result of *Br.m.* infection.

The paper ends with a discussion of the results of the measures taken by the Commission during the four years of its activity, e.g., the immediate segregation of diseased animals. A measure dealt with in particular is the removal of aborting ewes and their foetuses from the flocks, in consequence of which the percentages

of abortions and still births were progressively lowered from 19 and 18·4% respectively in 1988, to 5·2 and 2·6% respectively in 1986.

LAPORTE, A., BERSON, P., & MARGOUT, G. (1986). Un foyer briard de fièvre ondulante d'origine bovine. Trois formes anormales. [**Cases of *Brucella abortus* Infection in Man**].—*Bull. méd., Paris*. 50. 646-650. [Abst. from abst. in *Rev. Path. comp.* 37. 620].

The authors describe three cases of undulant fever in which the patients had been in contact with aborting cows. No bacterial work was done to prove the source of infection.

TAYLOR, R. M., LISBONNE, M., VIDAL, L. F., & HAZEMANN, R. H. (1988). **Investigations on Undulant Fever in France**.—*Bull. Hlth Org. L.o.N.* 7. 503-545. 4 figs., 9 tables. [8 refs.]

By  $H_2S$  production and the bacteriostatic action of thionin and basic fuchsin, 97% of 869 human and animal strains of brucella were classified into two types, *Br. melitensis* and *Br. abortus*, none of the *suis* variety being found. Statistics revealed a marked increase in undulant fever in man in early spring corresponding to the period of abortion among sheep and goats. Five tables show that goats, sheep and cows were the main animal reservoirs, infection in the first two being mostly due to *Br.m.* and in cows due to *Br.a.*; reference is made to the instances in which *melitensis* infection has been found in cattle. One table indicates that the risk of infection through animal contact was far greater than through the consumption of dairy products.

[This abstract only gives a bare outline of the veterinary aspects of the report. The original should be consulted].—R. O. MUIR.

MEWSON, I. E., & THORP, F., JR. (1988). **The Toxicity of Intestinal Filtrates From Lambs Dead of Overeating**.—*J. Amer. vet. med. Ass.* 93. 165-167. 2 tables. [5 refs.]

Examination over a period of six years of intestinal filtrates from lambs which had died of overeating revealed that 115 out of a total of 256 tested were toxic for laboratory animals. Only 2 out of 87 filtrates from lambs which had died of other diseases were toxic. Twelve out of 20 of the filtrates which were toxic for laboratory animals were fatal on subcutaneous injection to sheep in doses of 5-50 c.c.

The toxin was neutralized by the antisera of *Clostridium ovitoxicum* and the lamb dysentery bacillus. It was destroyed by heating to 60°C. for 30 minutes.

These observations suggest that overeating bears a close relationship to enterotoxaemia.—D. D. OGILVIE.

ALBISTON, H. E. (1987). **Blackleg in Lambs following Vaccination for Enterotoxaemia**.—*Aust. vet. J.* 13. 245-247. [2 refs.]

A. records losses in lambs following vaccination with formalized cultures of *Clostridium welchii* Type D. In two instances the vaccine contained alum, in a third it did not. Deaths resulted from blackleg within 48 hours. Cultures obtained from the lesions shortly after death contained only *Cl. chauvoei*. The latter organism was not detected in any of the vaccines used; all of these were free from pathogenic organisms. The losses occurred in lambs about two months old, and A. suggests that close grazing of bare pastures may have led to ingestion of spores of *Cl.c.*, which were transported to the tissues and remained latent until the irritant and cataphylactic action of vaccine facilitated germination and toxin production.

—T. S. GREGORY.

GENEV, C. (1987). Infekcii s nekroznija bacil (*Bac. necrophorus*) pri ovčetě. [**Bacillary Necrosis in Sheep**].—*Vet. Sbir.* 41. 259-271. 5 figs. [8 refs.] [Abst. from German summary].

G. describes a wide-spread outbreak of bacillary necrosis among sheep in Bulgaria in the summer and autumn of 1986, the chief lesions being inflammation of the coronets and mouth. Though generally mild, the infection caused a mortality of 30-40% in some flocks. Microscopic examination of material from the lesions revealed large numbers of *Fusiformis necrophorus* and smaller numbers of a short, rod-shaped organism; he considered that the former were the causal organism. Heavy rain, and the presence of ticks, were considered to be the predisposing factors in the outbreak.

G. emphasizes the need for state control measures against this disease owing to its economic importance. [The condition may possibly have been contagious ecthyma complicated by anaerobic infection—see *V. B.* 8. 525].

ROSATI, T. (1988). Esperimenti di vaccinazione contra le gangrene gassose degli animali. [**Vaccination against Gas Gangrene in Animals**].—*Azione vet.* 7. 926-938. 9 tables. [Numerous refs.]

Under this title R. deals with blackleg, malignant oedema, and bradshot. Experiments were carried out on g. pigs to determine the best method of preparing vaccines against *Clostridium chauvoei*, *Cl. septicum*, *Cl. oedematiens* and "*B. bradshot*", four to six day liver-broth cultures being used.

It was found that a vaccine containing 0.2-0.3% formalin gave the best results, and that after incubation for two days it had lost its virulence, but not its immunizing properties. Each organism tested was capable of producing a vaccine with specific immunizing properties. No cross-immunity existed between *Cl.c.* and *Cl.s.*, but a vaccine prepared from the former protected against *Cl. oedematiens*, whilst a vaccine prepared from "*B. bradshot*" though affording no protection against *Cl.o.*, did protect against some strains of *Cl.c.*—J. A. NICHOLSON.

WOLTERS, K. L., & DEHMEI, H. (1988). Ueber den Verlauf der aktiven und aktiv-passiven Immunität bei Tetanus. [**Active and Active-Passive Immunity to Tetanus**].—*Z. InfektKr. Haustiere.* 53. 140-147. 4 tables. [13 refs.]

Using alum-precipitated toxoid, either together with, or without, antiserum, a high level of antibody content could be maintained in the blood of g. pigs for at least six months after the second dose of toxoid. In the case of two g. pigs in which 0.5 c.c. of toxoid had been injected six months previously, a test dose of tetanus spores had no effect. W. states that a dose of toxoid after six months will cause the antitoxic value of the serum to return to the previous high level. In ten horses, three injections of 10 c.c., 10 c.c., and 20 c.c. of toxoid, with time intervals of three months between the first and second, and five months between the second and third injections, gave a response varying from 20 to 110 international units per c.c.—P. S. WATTS.

STUBENRAUCH, L. (1988). Zur epiduralen Antitoxinverabreichung bei Tetanus. [**Treatment of Tetanus by Antitoxin Epidurally**].—*Wien. tierärztl. Mschr.* 25. 278-279.

A clinical case of tetanus in a horse was cured by the epidural injection of 200 units of antiserum daily for 12 days, followed by 100 units daily for three days. A further case treated in the early stages responded to three injections of 200 units and two of 100 units.—P. S. WATTS.

GEURDEN, L. M. G., & WILLEMS, A. E. R. (1938). Kuikensterfte na sexen. [Transmission of an Anaerobic Infection to Chicks during Sex Differentiation].—*Vlaam. Diergeneesk. Tijdschr.* 7. 47-49. [2 refs.] [English, French and German summaries].

After a professional "chicken sexer" had done his work on a farm, 70% of the chicks died. The authors consider that anaerobic organism isolated from the carcasses were the cause of death, although they were not pathogenic when inoculated into rabbits, g. pigs and hens. The bacteriological work was not completed.—JAC. JANSEN (UTRECHT).

GOYAL, R. K. (1938). A Serological Study of the Actinomyces.—*Indian J. med. Res.* 25. 843-846. [14 refs.]

G. employed the complement-fixation test to study the antigenic structure of the *Actinomyces* and also of certain other bacteria. The strains of *Actinomyces* employed were unemulsifiable, and a methylic extract of the organism was used therefore as antigen.

The sera studied included those prepared against both rough and smooth strains of avian and mammalian tubercle bacilli, against paratuberculosis bacilli [acid-fast organisms other than *Mycobacterium tuberculosis* or \**M. paratuberculosis* (the bacillus of Johne's disease)] again including both smooth and rough strains, against actinomyces, and against *Corynebact. diphtheriae*.

G. was able to demonstrate an antigen common to *Actinomyces*, *Corynebacterium* and *Mycobacterium*. This antigen was absent from bacteria unrelated to *Actinomyces* on a microbiological basis. He concludes that the *Actinomyces* should be included within the schizomycetes.—L. E. HUGHES.

TUNNICLIFF, E. A. (1938). An Improved Medium for the Storage of *Actinomyces* [*Fusiformis*] *necrophorus* Cultures.—*J. infect. Dis.* 63. 113-116. 1 table. [2 refs.]

T. recommends a modification of Haslam's beef-brain-liver broth for the storage of *F.n.* The medium maintained the viability of nine strains for 460 days at room temperature and seven of ten strains, subcultured at three-monthly intervals, retained their pathogenicity for 1-7 years.—R. O. MUIR.

BAKER, J. A. (1938). Light as a Factor in the Production of Pigment by Certain Bacteria.—*J. Bact.* 35. 625-631. 2 tables. [1 ref.]

B. describes a number of strains of acid-fast bacilli (including an avian strain of tubercle bacilli) which formed pigment in the presence of light and were devoid of pigment when cultivated in darkness.

Brief exposure to sunlight and ultra-violet light, followed by incubation in darkness, also gave rise to pigment production. B. considers this a vital phenomenon, because organisms killed by heat did not develop pigment when exposed to light, pigment was not formed if cultures after exposure to light were kept at 4°C., and alcoholic extracts of unpigmented organisms (the pigment being soluble in alcohol) did not develop pigment after exposure to light.—D. L. HUGHES.

---

\* In future this organism will be called *Mycobacterium johnei* in this Bulletin.

## DISEASES CAUSED BY PROTOZOAN PARASITES

FRENCH, M. H. (1988). **Studies in Animal Trypanosomiases. IV. The Effect of *Trypanosoma congolense* and *Trypanosoma brucei* on Some Inorganic Blood Constituents.**—*J. comp. Path.* **51**, 119-127. 8 tables. [18 refs.]

Continuing his studies on the biochemical changes caused by *Tryp. brucei* and *Tryp. congolense* in cattle, sheep and donkeys [V. B. **9**, 11.], F. records that the inorganic phosphorus content of the blood was not changed during infection, whereas the blood calcium, although unaltered in several cases, decreased in others. The potassium content of the blood fell until death or the disease crisis, whilst the sodium and chlorine contents rose. These latter changes are ascribed to the anaemia which produced a lowered cell content and an increase of blood plasma, the cells being rich in potassium and the plasma in sodium and chlorine.—U. F. RICHARDSON.

SPRINHOLZ-SCHMIDT, A. J. (1988). Infection simultanée par le *Trypanosoma theileri* et le *Theileria sergenti* en extrême-orient. [Mixed Infection of Cattle with *Tryp. theileri* and *Th. sergenti* in the Far East].—*Ann. Parasit. hum. comp.* **16**, 117-120.

The author discusses the records of the detection of *Tryp. theileri* in various countries and the evidence as to its pathogenicity, which he considers is probably slight. He points out that the trypanosomes can rarely be detected in the blood of infected cattle unless the animals are depressed by the injection of various substances, by bleeding, or by other diseases. The appearance of *Tryp. theileri* in large numbers in the peripheral blood of a cow during the course of a *Th. sergenti* [*Th. annulata*] infection is recorded. The animal exhibited symptoms which were typical of the theileria infection.—U. F. RICHARDSON.

VAN SACEGHEM, R. (1988). L'immunisation des bovidés contre la trypanosomiase. [Immunization of Cattle against Trypanosomiasis].—*Bull. Soc. Path. exot.* **31**, 296-298. [Also appeared in *Bull. agric. Congo belge.* **29**, 141-142].

The author again draws attention to the method of immunizing cattle to *Tryp. congolense* by injecting them as calves under one month old. He claims that subsequent reinoculation with infected blood fails to produce further infection, and that immunized animals resist disease in areas in which the infection is transmitted by *Stomoxys*. He has not been able to test the value of the immunity in tsetse areas, and asks that other workers who have the opportunity should do so.—U. F. RICHARDSON.

MESNIL, F., PÉRARD, C., & PROVOST, A. (1988). Recherches expérimentales sur un trypanosome des ruminants de la Martinique. [Research on a Trypanosome of Ruminants from Martinique].—*Bull. Soc. Path. exot.* **31**, 377-381. 1 fig. [6 refs.]

The authors record investigations into a strain of trypanosome from Martinique which resembled *Tryp. vivax* both morphologically, and in that it was powerless to infect any of the small laboratory animals. The Martinique trypanosome appeared to be pathogenic to goats, but had little pathogenicity for sheep and horses. In the horse it caused a mild febrile reaction and urticarial symptoms. The symptoms subsided in two months and the trypanosomes disappeared from the blood. A year later the horse was reinfected with an African strain of *Tryp. vivax*, which caused death in six weeks. It is suggested that the low pathogenicity for sheep and horses distinguishes the organism here recorded

from *Tryp. vivax*. [Strains of *Tryp. vivax* from different parts of Africa appear to vary considerably in their pathogenicity].—U. F. RICHARDSON.

CHRISTENSEN, J. F. (1938). **Occurrence of the Coccidian *Eimeria bukidnonensis* in American Cattle.**—*Proc. helminth. Soc. Wash.* 5. 24. [1 ref.]

A sample of bovine faecal material from the Veterinary College at Cornell University was found to contain pyriform oocysts of a brown colour, opaque in appearance, and with a thick wall. This description corresponds exactly to TUBANGUI's description of *E.b.* oocysts from the Philippine islands; the only difference is that the American specimens were much smaller.

HOLMES, C. E., HERRICK, C. A., & OTT, G. L. (1937). **Studies in Coccidiosis in Chickens. Calcium Carbonate Additions and Coccidia.**—*Poult. Sci.* 16. 335-339. 5 tables. [4 refs.]

A series of three chick feeding experiments, with a basal chick mash used alone, and with the same plus 3% and 6% chick size oyster shell, are recorded to show the influence of calcium carbonate upon the susceptibility of chicks to coccidiosis. In the basal ration the Ca : P ratio was 1 : 1.07; with 3% and 6% oyster shell added it was 1 : 0.74 and 1 : 0.354 respectively.

The chicks of two such variously fed lots were tested at two weeks of age, and in the other experiment at four weeks of age, with approximately 200,000 sporulated oocysts of *Eimeria tenella*.

Percentage death rates from coccidiosis for the chicks fed on the basal ration averaged 46.2, on the 3% oyster shell ration, 53.6, and on the 6% oyster shell ration, 71.8.

An attempt to keep the Ca : P ratio the same as in the basal ration by adding sufficient disodium phosphate with the oyster shell was unsuccessful on account of the impalatability of the mixture, leading to death of the chicks from starvation.

—C. V. WATKINS.

TOUMANOFF, C. (1937). **Persistence des sporozoïtes du paludisme chez *A. minimus* après plusieurs prises de sang sur les animaux. [Persistence of Sporozoites of Malaria in *Anopheles minimus* after Several Feeds on Animals].**—*Bull. Soc. Path. exot.* 30. 765-767. [2 refs.]

T. captured a large number of *A.m.* in Cambodia and kept them alive by allowing them to feed on cattle and buffaloes. He states that some of the insects, already infected with malaria sporozoites before feeding on the animals, still carried the infection after many meals on them.—J. E.

BRUMPT, E. (1938). **Le paludisme des buffles, existe-t-il en Indochine et peut-il fausser les indices oocystiques et sporozoïtiques établis dans diverses régions asiatiques? [Possible Complications in Surveys of the Malarial Infection Rate in Mosquitoes in Indochina, Due to the Existence of Buffalo Malaria].**—*Bull. Soc. Path. exot.* 31. 479-483. 1 fig. [8 refs.]

B. criticizes the conclusion of TOUMANOFF [above] that oocysts and sporozoites of human malaria could persist for 25 days in *Anopheles minimus* in Cambodia. He points out that the oocysts described represented forms two or three days old, and, as the mosquitoes had been fed on a buffalo, the oocysts may have been those of *Plasmodium bubalis*. He points out that plasmodium infection of the buffalo is difficult to detect as the parasites are never numerous in the peripheral blood, and suggests that infection could be demonstrated by the sub-inoculation of newborn calves. As it seems buffalo infection may be more prevalent in Asiatic

countries than supposed, it is important that further research be undertaken, since, if the intermediate host proves to be a species of *Anopheles*, then mosquito surveys undertaken to ascertain the incidence of infection with human malaria may be complicated by infection with the buffalo parasite.—U. F. RICHARDSON.

DŽUNKOVSKI, E. (1937). Pregled radova o Balfourovim granulama u vesi sa novim nazivima ovog parazita. [**The Identity of Balfour Bodies**].—*Jugo-slov. vet. Glasn.* **17**. 315-321. 1 fig. [Numerous refs.] [German summary]. This article was also published elsewhere [see *V. B.* **8**. 428].

—B. OSWALD (KRIŽEVCI).

NIIMI, D. (1937). **Studies on Blackhead. II. Mode of Infection.**—*J. Jap. Soc. vet. Sci.* **16**. pp. 183-239 of pt. 1. 3 figs. on 1 plate, 9 tables. [9 refs.] [In Japanese: abstr from English summary pp. 23-26 of pt. 2]. [See also *V. B.* **6**. 801].

A discussion of work which is in accordance with well known facts.—J. E.

BLUMENBERG, W. (1937). Ueber die Weilsche Krankheit als Laboratoriums- und Stallinfektion. [**Human Leptospirosis Contracted from Laboratory Animals and Cages**].—*Zlb. Bakt. I. (Orig.)*. **140**. 100\*-104.\*

Three cases of Weil's disease in laboratory workers are recorded in which infection was believed to have been contracted by handling experimental rats and their cages. It was uncertain whether infection was percutaneous, by ingestion, or by the conjunctiva. In one case the complement-fixation and agglutination tests were negative, but organisms were detected P.M. in kidney sections. It is suggested that contact between experimental and wild rats should be prevented, rat attendants should wear goggles and rubber gloves, and the entry of unauthorized persons into the rat house should be prohibited. In the discussion which followed, infection of laboratory workers was also recorded from Heidelberg, Berlin, Marburg and Munich, the infection being traced in some cases to white rats, with no evidence that wild rats had been involved.—U. F. RICHARDSON.

PONCET, A. (1938). Spirochète du dromadaire. [**A Spirochaete of Dromedaries**].—*Bull. Soc. Path. exot.* **31**. 478-479. 1 fig.

P. detected a small spirochaete in a blood film of a dromedary from Touggourt. The organism is described as being 7.5 $\mu$  in length, having three turns in the spiral, and staining well by Giemsa. No information is given as to its pathogenicity.

—U. F. RICHARDSON.

WILSON, I. D., & MACDONALD, Ruth. (1938). **Some Notes on Sarcosporidia in Virginia.**—*J. Parasit.* **24**. 249-250. [4 refs.]

Of 34 cow hearts examined, 30 showed numerous cysts. Only eight out of 27 sheep hearts were infected. The neck muscle of a horse showed similar cysts.

The heart muscle of 29 calves 6-8 weeks old failed to reveal any cysts. The authors take this negative finding to confirm the accepted view that young animals which have not been to pasture are free from infection. The cysts in the cattle, sheep, and horse are described.—D. D. OGILVIE.

SABIN, A. B. (1938). **Isolation of a Filtrable, Transmissible Agent with "Neurolytic" Properties from Toxoplasma-Infected Tissues.**—*Science*. **88**. 189-191. [1 ref.]

A filtrable agent (size 314-360 $m\mu$ ) was isolated from the brains of mice affected with toxoplasma after the tissues had been frozen at -80°C. in order to kill parasites.

The disease produced was characterized by choreiform symptoms, and was only occasionally fatal. It was readily transmitted in series. The chief lesion was an acute necrosis and almost complete dissolution of the caudal part of the cerebellum.

The infective agent was found in most of the organs, but not in the brain. This observation suggests that the lesions in the brain were produced by some substance formed by the action of the transmissible agent on various cells of the body. Mice which had recovered were resistant to reinoculation. The agent was not found in the organs of mice free from toxoplasma infection.—R. E. GLOVER.

MACHATTIE, C. (1938). **Notes on Two Cases of Naturally Occurring Toxoplasmosis of the Dog in Baghdad.**—*Trans. R. Soc. trop. Med. Hyg.* **32**. 273-276. 16 figs. on 1 plate. [15 refs.]

A record of two fatal cases in street dogs of Baghdad. The chief symptoms were emaciation, anorexia, and dyspnoea. Autopsy revealed numerous small necrotic foci in the lungs and liver. Smears showed that the parasites were most numerous in the lungs, where schizont-like structures appeared, but single forms and binary fission types were found in the liver, spleen, submaxillary lymph nodes, heart blood, and muscle. No parasites were observed in smears from the brain, spinal cord, or kidneys. The general features of the parasites agreed with the accepted description of them [NICOLLE and MANCEAUX (1909)]. Attention is directed, however, to regularly occurring, pear-shaped masses of parasites which closely resembled schizonts, and which occurred only in the lungs. Neither in smears nor in sections, however, was proof of schizogony definitely apparent; nor does it seem likely that this process occurs, since reproduction by binary fission is definitely established.

The observation that toxoplasmosis is of seasonal occurrence, and appears during the coldest period of the year, is supported by the recording of these cases in March after a very cold winter.—D. D. OGILVIE.

## DISEASES CAUSED BY VIRUSES

PSCHORR. (1938). Beiträge zur veterinärpolizeilichen Bekämpfung der Maul- und Klauenseuche. [**Veterinary-Police Control of Foot and Mouth Disease**].—*Münch. tierärztl. Wschr.* **89**. 7-11.

P. considers that two things are necessary in the control, *viz.*, rapid action and conscientious co-operation. He deprecates keeping owners in a continuous state of apprehension, and considers it preferable to go in for extensive publication of symptoms, etc., as soon as the disease appears.

He deals with possible methods of transmission of the disease, and stresses the importance of seasonal visitors from infected areas, and the inadvisability of rat extermination by poisoning and by the use of strong-smelling liquids, both of which only force the rats to migrate from infected buildings to clean ones. Cats should be confined during the breeding season, and care should be taken to see that hauliers from infected areas are not allowed to procure "return loads" from farms. P. also discusses the organizations which he considers should be kept in readiness for dealing with an outbreak. There is no new information.—G. D. M.

FRENKEL, H. S. (1938). Maatregelen getroffen in verband met de heerschende mond- en klauweerepizootie 1937. [**Control Measures for the Foot and Mouth Disease Outbreak in Holland in 1937**].—*Tijdschr. Diergeneesk.* **65**. 72-76.

At the beginning of 1937 odd outbreaks of F. & M. disease were observed;

the first important outbreak in the recent epizootic was in July. The virus was cultivated in bovine embryo tissue cultures, and when 24 oxen were infected with the culture virus, a serum of high titre was obtained. After two or three bleedings reinoculation was necessary to maintain the high titre of the serum. To provide large quantities of serum for practitioners, convalescent animals had to be used.

—JAC. JANSEN (UTRECHT).

KANYÓ, B., & GABOR, O. (1988). Komplementbindungsversuche in einem Fall von Maul- und Klauenseucheinfektion beim Menschen. [**Complement-Fixation Test in a Case of Foot and Mouth Disease in Man**].—*Z. Immun-Forsch.* 92. 20-26. 2 tables. [15 refs.]

The authors record a case of F. & M. disease in a human being, in which they carried out c.-f. tests with his blood serum during convalescence, using Ciuca's technique [(1928). *J. Hyg.* 23]. An aqueous suspension of ground vesicle shreds from an infected g. pig was used as the antigen, the virus strain being the same "O" type which had previously been isolated from the human patient. Moderately strong complement fixation was obtained both with the human serum and with serum of infected g. pigs. The authors consider that the c.-f. test is specific in F. & M. disease.—J. E.

I. BENNETTS, H. W. (1987). The Use of the Complement-Fixation Test in the Control of Bovine Pleuro-Pneumonia.—*Aust. vet. J.* 13. 178-183. 1 table. [6 refs.]

II. TURNER, A. W., & CAMPBELL, A. D. (1987). A Note on the Application of the Complement-Fixation Test to the Control of Bovine Pleuro-Pneumonia.—*Ibid.* 183-186.

I. B. describes the application of the c.-f. test [see II] in an attempt to eradicate contagious bovine pleuro-pneumonia from a herd of 92 cattle. The slaughter of reactors to a series of six tests (monthly) failed to eradicate the disease. This was not due to false results, as P.M. examination of all the animals provided almost complete confirmation of the serological tests. Failure was attributed to the long intervals between tests and the long incubation period of the disease.

II. The authors discuss the practical difficulties described by BENNETTS [above] and admit that, although in some outbreaks the application of this serological test has facilitated the eradication of the disease from unvaccinated herds, it would probably be too irksome in others. They agree that the length of the incubation period in some animals introduces the greatest difficulty, and consider it safe to assume that the maximum period would not exceed 90 days. They suggest that the more practicable method of controlling the disease in dairy herds is as follows:—(a) quarantine of the infected property and those in contact; (b) slaughter of clinical cases; (c) collection of sera for testing, followed by immediate vaccination, and observations on the extent of tail reactions; (d) the removal and slaughter of positive and suspicious reactors, and (e) retest of survivors eight weeks after vaccination. The results of the retest [in (e)] should be examined and any reaction which is strongly positive with a serum dilution of 1:320 or greater will probably be due to natural infection and not to tail inoculation. "Carriers" may thus be eliminated from amongst the "clean" and now actively immunized animals.—T. S. GREGORY.

BECK, C. E., & WYCKOFF, R. W. G. (1988). The Antigenic Stability of Western Equine Encephalomyelitis Virus.—*Science*. 88. 264. [2 refs.]

G. pigs vaccinated subcutaneously with two strains of western equine enceph.

phalomyelitis virus, prepared from brains of horses that died in the 1938 outbreak, proved immune to an intracerebral test inoculation two weeks later with 100-1,000 M.L.D. of the homologous strains. They were also immune to strains from widely differing sources, *viz* :- (1) g. pig-passaged virus from the 1938 brains; (2) the same virus after 60 egg embryo passages; (3) mouse-passaged virus from a 1938 brain, and (4) 1937 field-virus from Iowa and Texas, after several g. pig passages.

The authors conclude that transfer to animals other than horses does not alter the antigenic structure of the western strain of the virus, that the disease is substantially the same in the different districts affected, and that vaccines are still effective against a strain of several years later than that from which they are made.

- I. POOL, W. A. (1937). **Sir John M'Fadyean's Work on "Louping-III".**—*J. comp. Path.* **50**. 393-394.
- II. STEWART, W. L., & PONSFORD, Phyllis A. (1937). **Lamb Diseases Coincident with Louping-III.**—*Ibid.* 395-400.
  - I. A brief account of work already published [*V. B.* **1**. 57 and 129].
  - II. Investigations were conducted in Northumberland during 1936 and 1937 on the heavy losses amongst lambs from alleged "louping-ill". Vaccination against true louping-ill proved to be of no value, and of 99 dead lambs examined, louping-ill was suspected in only five; no attempt was made, however, to recover virus. Another 50 lambs were affected with pyaemia, which would appear to be the main factor concerned in the death rate. In 1937, 110 lambs were examined. Sixty-eight of the deaths were due to pyaemia and *Clostridium welchii* Type D infection, either separately or combined; in 23 the cause of death was indefinite, and a number of these may have been due to true louping-ill. This disease is, therefore, of no very great significance in the lamb mortality in the districts examined, the majority of deaths being due to pyaemia directly or indirectly and to the entero-toxaemic group of diseases.—A. WILSON TAYLOR.

LASZLÓ, H. (1937). A sertéspestis elleni szimultánoltás az ú.n. oltási telepeken. [**Simultaneous Inoculation against Swine Fever at the So-Called Inoculation Settlement**].—*Allatorv. Lapok.* **60**. 138-142. 5 figs., 1 table. [4 refs.]

The Rumanian veterinary-police regulations state that, on farms where complete isolation of inoculated animals is impossible, simultaneous inoculation against S.F. should only be carried out when the surrounding district is already infected. To allow of active immunization of piglets against S.F. at any desired time, certain villages in Rumania have erected large isolation buildings, complying with the hygiene regulations where each individual farmer living in the neighbourhood may send his pigs, there to be kept under veterinary-police supervision for 30 days after simultaneous inoculation.—G. SÁLYI (BUDAPEST).

DOBSON, N. (1937). **Pox in Pheasants.**—*J. comp. Path.* **50**. 401-404. [2 refs.]

D. describes an outbreak of pox in pheasant chicks 4-10 weeks old. It was possible to infect pheasants, fowls and pigeons artificially with material from the natural cases of the disease. Liver and bone-marrow from artificially infected pheasants were infective for pigeons after filtration through a Seitz filter.

Contrary to the usual findings, good lesions were produced in both fowls and pigeons. On further passage in fowls the lesions increased in size, but virus from the 12th passage in fowls produced only slight lesions when inoculated into pigeons. Pheasants inoculated with pigeon pox virus showed a normal reaction similar to that in fowls, and a month later such inoculated pheasants were resistant to virulent pox virus from pheasants.

D. concludes that this virus was actually neither a fowl nor a pigeon pox virus, but appeared more nearly related to the latter.—D. L. HUGHES.

SEIFRIED, O. (1937). Einfluss von Virusvirulenz und Infektionsart auf den anatomischen Charakter der sog. Laryngotracheitis der Hühner. [**The Influence of the Method of Infection and the Virulence of the Virus on the Pathological Character of Avian Laryngotracheitis**].—*Z. InfektKr. Haustiere*. 52. 108-123. 4 figs. [6 refs.]

An outbreak in pheasants was found to be due to the virus of fowl laryngotracheitis. The virus was passaged in fowls. From the seventh passage there was a shortening in the incubation period, and at the same time the virus caused laryngotracheitis in addition to rhinitis. It is suggested that clinically there is a nasal, a laryngotracheal and a mixed form of affection due to the virus. The nasal form usually occurs after artificial infection *via* the conjunctiva, and when numerous susceptible birds are kept together in a confined space. As the disease develops, the larynx and trachea become involved (the combined form), and the rhinitis ceases. Chronic rhinitis is very rare. The laryngotracheal form results from direct inoculation into the trachea, or indirectly as explained above. When the disease begins in the trachea, the nasal passages and the eyes do not usually become involved, but attenuated virus may cause rhinitis alone without complications.

—SASSENHOFF (MUNICH).

FRAENKEL, E. M., & MAWSON, C. A. (1935). **Adsorption and Elution of the Rous Sarcoma Agent**.—*Brit. J. exp. Path.* 16. 416-422. 4 tables. [13 refs.]

The authors succeeded in separating the infective agent from Rous sarcoma tissue by extraction for 30 minutes in a refrigerator with M/15 buffer phosphate followed by adsorption into Wilstätter alumina C or D. The most potent eluate was obtained when the adsorption was carried out at a pH of 7.5-8.4.—J. E.

FRAENKEL, E. M., & MAWSON, C. A. (1937). **Further Studies of the Agent of the Rous Fowl Sarcoma: A. Ultra-Centrifugation Experiments; B. Experiments with the Lipoid Fraction**.—*Brit. J. exp. Path.* 18. 454-460. 1 fig. on 1 plate, 2 tables. [15 refs.]

A. Describes experiments which show that there is no relationship between the number of elementary bodies present and the power of tumour formation. Eluates containing few elementary bodies were rich in agent, leading the authors to conclude that these bodies do not wholly represent the agent.

B. Describes experiments suggesting that the agent is of a chemical nature, and points out that after extracting with acetone and carbon tetrachloride the agent is retained in the residue and some inhibitor appears to be present in the extract.—J. E. WILSON.

PENTIMALLI, F., & SCHMIDT, G. (1935). Ueber das Verhalten der Phosphorfractionen in Blutplasma sarkomkranker Hühner. [**The Phosphorus Content of the Blood Plasma of Hens with Sarcoma**].—*Biochem. Z.* 282. 62-73. 4 tables. [5 refs.]

Twenty-nine fowls were infected by inoculation of virulent material into the wing vein; nine controls were also used. The blood for P estimation was obtained from the carotid artery and from the wing vein of the fowls. The blood collected from the wing vein of the affected fowls had consequently come straight through the tumour. The blood was examined for total P, acid-soluble P and lipid P.

In general it was found that the total blood P of sarcomatous fowls was 30%

greater than in the normal fowls, that protein P was present in the affected, but not in the normal fowls (by deduction from the fact that the totals of acid-soluble P and lipid P exceeded the total P by the method of estimation used), and that acid-soluble P was obtained only from venous blood coming from normal muscles and not in that from sarcomatous tissue.—J. E.

NYFELDT, A. (1937). Høns-leucoserne. [**Fowl Leucosis**].—*Skand. VetTidskr.* **27**. 509-577. 10 figs., 1 plate, 5 tables. [Numerous refs.] [English summary].

The globulin fraction of citrate plasma is richer in agents causing myeloblastosis than the albumin fraction. A "strain" of myeloblastosis was transmitted through 14 generations without producing erythroblastosis or lymphatic leucosis. Myeloblastosis of hens is considered to be analogous to human myeloblastosis from the haematological and histopathological aspects.

Lymphatic leucosis is the most common form (50-60% of cases examined) and is analogous to human lymphatic leucosis. In most cases it is aleucaemic, but typical leucaemic cases may also be seen. It must be looked upon as transmissible, though N. does not consider this to have been confirmed experimentally.

Erythrosis (erythroblastosis) shows a very varying clinical picture, with acute leucaemic forms at one extreme and chronic aleucaemic forms (the so called anaemic forms) at the other extreme, with transitional forms between.

Inoculation into chickens of material from anaemic "aleucaemic" erythrosis often produced typical acute "leucaemic" erythrosis.

—H. C. BENDIXEN (COPENHAGEN).

BULL, L. B., & DICKINSON, C. G. (1937). **The Specificity of the Virus of Rabbit Myxomatosis**.—*J. Coun. sci. industr. Res. Aust.* **10**. 291-294. 1 table. [4 refs.]

Many experiments by workers outside Australia have provided evidence that this virus is capable of producing disease only in the European rabbit (*Oryctolagus*). The authors confirmed and extended this evidence by inoculating 124 animals, including a number of native marsupials, reptiles and birds. None of these animals developed any symptoms of disease.—T. S. GREGORY.

LEDINGHAM, J. C. G. (1937). **Studies on the Serological Inter-Relationships of the Rabbit Viruses, Myxomatosis (Sanarelli, 1898), and Fibroma (Shope, 1932)**.—*Brit. J. exp. Path.* **18**. 436-449. [8 refs.]

L. describes the material and the methods he has employed in the examination of the sera of rabbits for agglutinins against the elementary bodies of these two diseases.

Results of the examination of the sera of five rabbits recovered from myxoma and two with fibroma indicated the presence of agglutinins against myxoma elementary bodies. These agglutinins were not present in the sera of a normal rabbit. L. demonstrated the presence of anti-myxoma agglutinins as early as the third day after inoculation with fibroma. This may explain the early resistance to myxoma offered by fibroma-infected rabbits.

Enquiries into the course taken by agglutinins in individual rabbits studied over long periods indicated that agglutinin development for myxoma elementary bodies was the chief response both to myxoma and fibroma infection, while significant titres for fibroma were not invariably encountered. Studies were also made on the development of agglutinins after the inoculation of virulent myxoma virus and its neuro-myxoma variant, and on the further development of agglutinins to

reinoculation of myxoma-recovered fibroma-infected rabbits. Agglutination-absorption experiments with antisera against the elementary bodies of these two diseases further emphasized the antigenic affinity of these two viruses.

L. discusses the theory of the transformation of fibromato-myxoma virus in the animal body.—L. E. HUGHES.

- I. AHLSTRÖM, C. G. (1938). **The Histology of the Infectious Fibroma in Rabbits.**—*J. Path. Bact.* **46**. 461-472. 7 figs. on 2 plates, 1 table. [12 refs.]
- II. AHLSTRÖM, C. G., & ANDREWES, C. H. (1938). **Fibroma Virus Infection in Tarred Rabbits.**—*Ibid.* **47**. 65-86. 11 figs. on 4 plates, 1 table, 1 chart. [18 refs.]
- III. THOMPSON, R. L. (1938). **The Influence of Temperature upon Proliferation of Infectious Fibroma and Infectious Myxoma Viruses in vivo.**—*J. infect. Dis.* **62**. 307-312. 2 tables. [9 refs.]

I. The Shope fibroma appears 3-5 days after inoculation with infective material; in this instance, bacteria-free emulsions of testes were used. Ten to 18 days after injection the tumour had reached its maximum, and had completely disappeared after a further 7-14 days. Positive results were obtained after intracutaneous, epidermal and intramuscular inoculation, and in one case, which terminated fatally due to involvement of the bowel, after intraperitoneal inoculation. Histologically, the tumour displays both inflammatory and neoplastic features. The early stages are mainly granuloma-like, but later the neoplastic features predominate. The fibroma cells originate from fibroblasts, perivascular histiocytes, and endothelial cells, and show characteristic basophilic cytoplasmic inclusions increasing in size and number with the tumour, while the epithelium overlying the intracutaneous tumour shows eosinophilic granules and sometimes hyperplasia. Regression occurs primarily through necrosis, but also by resorption.

II. The intramuscular inoculation of tar into fibroma-infected rabbits caused marked delay in the regression of the tumour (OA strain). In some cases the tumours grew progressively, resembling true neoplasms much more closely than those produced in the untreated rabbit. If the virus was given intravenously, generalized fibromatosis usually developed and sometimes ended fatally. A single injection of tar was sufficient to produce the above results, but had no apparent effect on the IA strain of the virus, or on vaccinia virus.

III. The maintenance of the skin of rabbits at a temperature approximating to that of the internal organs inhibited the development of the Shope fibroma (OA strain). This is given as a possible explanation of the fact that this virus normally affects only the superficial tissues. The same effect was obtained, in a lesser degree, with infectious-myxoma virus, which is antigenically related to the fibroma virus. Animals that did not develop active infection also failed to develop immunity.—A. WILSON TAYLOR.

WEBSTER, I. T. (1938). **Japanese B Encephalitis Virus; its Differentiation from St. Louis Encephalitis Virus and Relationship to Louping Ill Virus.**—*J. exp. Med.* **67**. 609-618. 4 figs. on 2 plates, 3 tables. [Numerous refs.]

W. states that Japanese B encephalitis virus will infect mice, monkeys and sheep, but that, according to reactions obtained in different species of animals, it differs from the St. Louis virus, though somewhat similar to that of louping-ill. It is serologically distinct from both, however. The method of spread of these and of other virus infections of the central nervous system is discussed, together with the evidence for and against infection *via* the upper respiratory and subcutaneous routes, but no conclusion is reached.—A. WILSON TAYLOR.

KREIS, B. (1937). La Maladie d'Armstrong. Chorio-méningite lymphocytaire. Une nouvelle entité morbide ? [**Armstrong's Disease (Lymphocytic Chorio-meningitis)**].—*Thesis, Paris*. pp. 160. 14 figs. [Numerous refs.]

During research on this disease, fowls, pigeons and cats were found to be insusceptible.—J. E.

I. DERRICK, E. H. (1937). "**Q**" Fever, a New Fever Entity : Clinical Features, Diagnosis and Laboratory Investigation.—*Med. J. Aust.* Aug. 21st. 281-299. 14 figs., 18 tables. [4 refs.]

II. BURNET, F. M., & FREEMAN, Mavis. (1937). **Experimental Studies on the Virus of "Q" Fever**.—*Ibid.* 299-305. 6 text figs., 3 figs. on 1 plate, 1 table. [3 refs.]

I. An investigation of cases of fever occurring among workers in a large meat works led D. to describe a fever entity of a type not previously differentiated, and which he provisionally named "**Q**" fever. This fever differed clinically in many respects from the usual typhus fevers, and the serum of patients did not agglutinate any of the usual range of "**O**" proteus suspensions. In no case did the disease prove fatal. G. pigs reacted to inoculation with blood or urine from patients and were thereafter immune. As the nine cases investigated occurred in meat workers or dairy farmers, an animal reservoir of infection, with a blood-sucking parasite as a vector, was suspected. Preliminary attempts to find such a reservoir using material from cattle, sheep and pigs were not successful.

II. Working with material submitted for investigation by DERRICK [above], the authors were able to show that the mouse is susceptible to "**Q**" fever, and to demonstrate the presence of large numbers of rickettsial organisms in the spleens of infected mice. Semi-purified suspensions of these organisms were agglutinated by sera from infected g. pigs and monkeys and from human patients.—T. S. G.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

NATVIG, L. R. (1937). Ueber die Differentialdiagnose der Larven von *Hypoderma bovis* und *H. lineatum*. [**On the Differentiation of the Larvae of *H.b.* and *H.l.***].—*Festschr. Bernhard Nocht, 1937*. pp. 386-393. 4 figs. [Numerous refs.] Hamburg : Friederichsen de Gruyter & Co.

*Hypoderma* species are fairly common in the southern parts of Scandinavia, and were previously believed to be principally *H.b.* A critical revision of some of the Norwegian collections showed that most of the material was wrongly named and indicated that *H.l.* is the commonest species, both in Norway and Sweden. Similarly, in Finland and Denmark, investigation revealed *H.l.* to occur more commonly than was previously believed.

Examination of the distinguishing larval characters of the two species, as given by LAAKE in the U.S.A., revealed some slight differences of degree between the Scandinavian and American forms, particularly in respect to the stigmal plates. Tables are given of the range of variation found in the number of stigmal discs in Norwegian and American forms of the two species.—J. MACLEOD.

MLINAC, F., & OSWALD, B. (1937). Početna istraživanja o otrovu iz jaja krpelji *Boophilus calcaratus balcanicus* (Minning) ispitano na zamorcima. [**Preliminary Studies on the Poison Contained in the Eggs of the Tick *B.c. balcanicus* (Minning), Tested on Guinea Pigs**].—*Vet. Arhiv.* 7. 277-297. 2 figs., 2 tables. [Numerous refs.] [English summary].

Because of the heavy losses caused by tick paralysis (so-called "*shimteera*"

disease in Yugoslavia) [*V. B.* 7. 334.], the authors arranged a systematic investigation of all the species of ticks occurring in that country. Their earlier work dealing with *Hyalomma savignyi* (later re-identified as *H. scupense*) [*V. B.* 7. 585.], was continued in their study of *B.c. balcanicus*. REGENDANZ and REICHENOW'S crushed-eggs method [*V. B.* 7. 585.], modified by the authors, was used again. It was ascertained that a strong paralysing poison is present in the eggs of *B.c. balcanicus* in almost the same strength as that found in *Hyalomma*, since 0.5 c.c. of standard extract (equivalent to 0.1 g. eggs) administered subcutaneously in the neck, caused tick paralysis in g. pigs, with a fatal outcome, by the 4th or 5th day. The poison is thermolabile; it is not destroyed by either 0.2% HCl, or 0.1% NaOH, and is not digested by pepsinase or ptyalin.

CLARKE, C. H. D. (1937). **American Dog Tick, *Dermacentor variabilis* Say, in Ontario.**—*Canad. Field Nat.* 51. 99. [4 refs.] [Copied verbatim from *Rev. appl. Ent.* 26. 285].

*Dermacentor variabilis*, Say, was taken on a dog in Ontario in 1935. There is apparently only one previous record of its occurrence in the Province.

MICHAELIS. (1936). Die Pferdelaus und ihre Bekämpfung. [**The Control of Horse Lice**].—*Z. Veterinärk.* 48. 385-401 and 426-442. [Numerous refs.]

Lice are prevalent on army horses in Germany and are difficult to eradicate. The parasite, *Haematopinus equi*, has a life-cycle of 15 days' duration at an optimum temperature of 35°C. At a lower temperature, 12°C., the lice are stiff and inactive, and at temperatures over 50°C. they die. They cannot survive for longer than two days without food at their optimum temperature, but they can survive for seven days at a lower temperature.

Methods of killing lice are reviewed in detail. Killing agents include poisonous gases or vapours such as formalin, carbon monoxide, sulphur dioxide and hydrocyanic acid. Contact poisons include watery solutions containing sulphur, arsenic or tobacco, or black sulphur ointment, hydrocarbon oils or cresol. Fats and oils are also used with the object of suffocating the parasites. M. tested several preparations and mixtures and gives his results. A copper preparation called "cuprex" is recommended, also a mixture of three parts nicotine, 50 parts glacial acetic acid, and 1,000 parts "aqua fontana." Horses should be dressed with this at six-day intervals. Advice is also given on the treatment of harness, stable fittings and stables.—F. FREUDENBERG (HAMBURG).

BARTELS. (1937). Ueber die Ergebnisse der neuen Bekämpfungsverfahren der Schafräude und künftig zu empfehlende Massnahmen. [**Results of a Campaign against Sheep Scab**].—*Dtsch. Tierärztebl.* 4. 357-360. 1 table.

Sheep scab has been a notifiable disease in Germany since 1894, but until recently attempts to eradicate it had given unsatisfactory results. B. discusses the reasons for this. In 1936 an extensive campaign was initiated in heavily infected districts, and all flocks, whether infected or not, were passed through a sulphur-lime dip. Infected flocks were dipped twice, the second time not earlier than seven and not later than nine days after the first. Dipping had to be done soon after shearing when the wool was shorter than 1-2 cm. The results were apparently good, and it is added that the quality of the wool was much improved.—M. F. B.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

CARPANO, M. (1938). Strongilosi gastro-intestinale degli ovini e caprini in Albania. [**Gastro-Intestinal Strongylosis of Sheep and Goats in Albania**].—*Azione vet.* 7. 123-131. 4 figs. [4 refs.]

Gastro-intestinal strongylosis causes severe loss in sheep and goats during the summer on marshy land in Albania. The chief cause is *Haemonchus contortus* and the next important *Nematodirus filicollis*; these two parasites are described in detail, as well as the clinical condition. Other parasites found include *Fasciola hepatica*, *Dicrocoelium dendriticum*, *Tricocephalus affinis*, and *Eimeria faurei*.

For parasitic gastritis, one part of sodium arsenite to four parts of copper sulphate [the remedy used at Onderstepoort] are recommended, to be administered according to a dosage scale which ranges from 12 cg. for young lambs to 60 cg. for sheep over two years old. For fascioliasis, Venice turpentine in benzol (1 : 5) is recommended, the dose for sheep and goats being 3 c.c., in a capsule.

HSÜ, H. F., & CHOW, C. Y. (1938). **Studies on Helminths of Fowls. I. On the Second Intermediate Hosts of *Metorchis orientalis* and *M. taiwanensis*, Liver Flukes of Ducks. II. Some Trematodes of Fowls in Tsingkiangpu, Kiangsu, China.**—*Chin. med. J. Suppl.* No. 2. pp. 433-450. 6 figs. on 4 plates, 2 tables. [Numerous refs.] [In English].

I. The authors confirm *Pseudorashora parva* as second intermediate host of *M.o.*, and add *Ps. rivularis*. They suggest there are final hosts of *M.t.* and *M.o.* other than fowls. Their experiments show that the latter are chiefly parasites of the gall-bladder, only a few being found in the bile ducts.

II. This article contains the authors' observations on specimens they examined of known species of trematodes, viz : *Prosthogonimus japonicus*, *Metorchis orientalis*, *Metorchis taiwanensis*, *Opisthorchis tsingkiangpuensis*, *Hypoderaeum conoideum*, *Pholopthalmus sinensis*, *Psilochasmus longicirratu*s, and *Harmostomum gallinum*.—J. A. GRIFFITHS.

BRITTON, J. W. (1938). **Studies on the Normal Variations in the Strongyle Egg Counts of Horse Feces.**—*Cornell Vet.* 28. 228-239. 2 tables, 2 charts. [18 refs.]

Factors affecting the degree of infection may be divided into three groups :—(1) affecting the viability and development of eggs and free-living larvae (i.e., environmental); (2) affecting transmissibility of infective larvae, and (3) affecting parasitic development of larvae in the host. B. asserts that vast numbers of eggs and larvae are killed in winter or retarded in growth until spring or early summer. Retardation of larval development is not evident in faecal examinations until the spring, which is thus the best time for treating horses affected with strongyles. Spreading faeces in the open, especially in dry months, is quite lethal to all stages of strongyles; surviving parasitic forms are weak and inactive after even short exposure. Violent temperature fluctuations are most lethal to pre-parasitic stages; eggs and infective larvae are more resistant to freezing. Intermonthly fluctuations in the egg count were correlated with environmental conditions. Intermonthly variations in the egg output of horse strongyles are unrelated to atmospheric conditions and are possibly due to intermission of egg production. Artificial infection with strongyle larvae indicated that there is a period of five months between ingestion of larvae and maximum egg production of the females.—J. A. GRIFFITHS.

- I. JOLING, K. F. (1938). Een voor Nederland onbekende parasiet in de conjunctivaalzak van het rund. [**A Parasite of the Conjunctival Sac of Cattle, hitherto Unknown in Holland (*Thelazia*)**].—*Tijdschr. Diergeneesk.* 65. 671.
- II. BAUDET, E. A. R. F. (1938). *Thelazia gulosa*, een parasiet uit de conjunctivaalzak van het rund. [*Th.g., a Parasite of the Conjunctival Sac of Cattle*].—*Ibid.* 672-673. [4 refs.]
  - I. Pus found on the conjunctiva of both eyes of a three-year-old cow, was found to contain small male and female worms, believed to be *Thelazia*.
  - II. The four male and four female worms were found on examination to be *Th.g.* This was the first time this parasite had been found in the Netherlands. —JAC. JANSEN (UTRECHT).
- HOŠEK, A. (1937). Habronemosa koní. [**Habronemiasis in Horses**].—*Voj. Vet.* 6. 1-10. [Numerous refs.] [Abst. from English summary].  
This is a short review, with no new information.—J. E.
- I. NOLF, L. O., & CRUM, J. D. (1937). **On the Production and Migration of the Larvae of *Trichinella spiralis***.—Copied *verbatim* from *J. Parasit.* 23. 574.
- II. NOLF, L. O. (1937). **The Transplantation of Gravid *Trichinella spiralis***.—*Ibid.* [Also *verbatim*].
  - I. An effort was made to determine quantitatively the time of production and the numbers of larvae produced by *Trichinella spiralis*. Rats were infested *per os* with 3,000 larvae each. Beginning on the fifth day after infection and on each day thereafter rats were autopsied and 1 c.c. samples of blood were obtained from the left ventricle, the right ventricle and the portal vein. These were drawn in Na citrate and the larvae concentrated by centrifuging. The results of these examinations showed a surprising absence of larvae in the blood. From some examinations a few larvae were found on the 6, 7, 8, 9, 10, 15, 17 and 18 days following infection but gave no indication of the total reproductivity of the worms in the intestine. In addition, the lymph cistern, the liver and the lungs were examined by dissection and pressing between slides. Larvae were not found by this method of examination.
  - II. Rats were infected with *Trichinella spiralis* and on the fifth day of infection a biopsy was performed and a single gravid female removed and transplanted to the intestine of an uninfected rat. Four such transplants were made. Two rats died from post-operative septicemia. The remaining two were autopsied six weeks later and the carcasses digested. From the one rat 1,112 larvae were obtained and the other rat yielded 14 larvae.

## IMMUNITY

- PLUM, N. (1938). **On the Value of the Tuberculin Tests as Applied to Various Domestic Animals—Especially Cattle**.—*Skand. VetTidskr.* 28. 97-105. [In English: Swedish summary].

In hens the intradermal tuberculin test in the wattles with avian tuberculin is considered of little value, as a great many of these birds fail to react on this test even if they are tuberculous.

P. speaks of horses in which no lesions could be found P.M. although the horses had given positive reactions to avian or bovine tuberculin.

In swine the intradermal test is considered of great value. Simultaneous tests

with bovine and avian tuberculin make it possible, with a fair degree of certainty, to decide *in vivo* the type of infection in the animal in question.

In the case of cattle, in Denmark as well as in several other countries, the tuberculin test forms the basis for eradication campaigns. Infections which cause false reactions are:—(1) the so-called "skin lesions", which have not yet been found in Denmark, and (2) Johne's disease, in which there is often a reaction with avian tuberculin, but seldom with bovine tuberculin. Differential diagnosis between Johne's disease and avian infection must be based on clinical symptoms; in avian infection it is generally young animals which react, while in Johne's disease most reactors are older animals.

The differentiation between bovine and avian infections by means of the two types of tuberculin and simultaneous inoculations is discussed, and cases of infection with the human type are also mentioned. Diagnosis of human type infections can only be made "probable" in herds previously freed from TB. If it is proved that reactions are caused by bacilli of the avian or human type and the sources of infection are removed, the reacting animals will generally lose their hypersensitivity after six months.—H. C. BENDIXEN (COPENHAGEN).

RUSSEFF, C. (1938). Der heutige Stand der Tuberkulinfage. [**The Present Status of the Tuberculin Problem**].—*Dtsch. tierärztl. Wschr.* **46**. 135-138. 1 table. [14 refs.]

R. re-emphasizes that the best tuberculin is prepared by growing tubercle bacilli upon Dorset's synthetic medium [*V. B.* **8**. 520]. In addition it is emphasized that a campaign to control bovine TB. will not be successful unless porcine and avian TB. are also eliminated at the same time.—E. J. PULLINGFR.

BOQUET, A. (1937). Tuberculines et réactions tuberculiniques. [**TB. and Tuberculin Tests**].—*Rec. Méd. vét.* **113**. 696-715.

The preparation of "old tuberculin" and synthetic tuberculins is described. It is noted that the properties of tuberculin rest in the protein fraction, which in synthetic media can be estimated and was found in the case of strain H 37 (human) to reach a maximum at the 12th week and with strain Vallée (bovine) at the sixth week. B. considers that the local and general reactions of tuberculin are probably due to two separate entities. Pasteur Institute tuberculin is prepared in synthetic medium and sterilized by filtration after 6-8 weeks' growth. Precipitation is effected by a mixture of phosphotungstic and sulphuric acids, and separation is done by centrifugation. The precipitate is washed with dilute sulphuric acid and eluted with  $\text{Ba}(\text{OH})_2$  solution. It is then centrifuged, decanted and filtered and has a strength approximately equal to that of "old tuberculin". Methods of titration, and allergic and desensitization phenomena, are discussed, together with a short notice of the theories of the mechanism of allergy.—P. S. WATTS.

ŠTRITER, V., & KOTLJAROVA, H. (1937). Serologičeskaja i allergičeskaja diagnostika brucelleza u ovec v paralelnykh opytah. [**A Comparative Study of Allergic and Serological Methods of Determining Brucellosis in Sheep**].—*Brucellosis in Sheep*. pp. 295-302. 4 tables. Moscow: Viem Publ. Dept.

The authors give a general critical survey of the results obtained during the three years of the Sheep Brucellosis Commission's activity in North Caucasus. From the first the complement-fixation test was found to offer no advantages over the agglutination test, and was discarded from further study because of its complexity. All the data collected are considered to establish conclusively the superiority of the allergic to the aggl. test, especially by reason of the small percentage of

doubtful and false negative results obtained with the former in both naturally and experimentally infected animals. "Brucellysate" [*V. B.* 9. 96.] is again stated to have given the most reliable results, its very low sensitizing action allowing as many as three tests, at intervals of one or two months in animals suspected to be infected. In important cases, however, such as the selection of breeding ewes for artificial insemination, it is considered advisable at the first test to use both the agglutination and allergic methods simultaneously.

- I. POHL, G. (1937). Beitrag zum Vorkommen unspezifischer Reaktionen bei der Rotzkomplementbindung. [**Non-Specific Reactions in Complement-Fixation Tests for Glanders**].—*Berl. tierärztl. Wschr.* Dec. 3rd. 747-748.
- II. HUPBAUER, A. (1938). Einige Bemerkungen zur Mitteilung von Dr. G. Pohl: Beitrag zum Vorkommen unspezifischer Reaktionen bei der Rotzkomplementbindung. [**Comments on Pohl's Article on Complement Fixation in Glanders**].—*Ibid.* Jan. 28th. 53-54.

I. An imported horse in apparently good health gave positive reactions to the conglutination and agglutination tests for glanders. It had already been tested for glanders [method not stated] before importation. About 11 days after the positive reaction it reacted negatively and continued to do so from then onwards. P. considers that the positive reactions were non-specific.

II. H. quotes details from a previous publication of his own [*V. B.* 8. 590.] claiming that horses usually give a positive reaction to the conglutination test 10-20 days after the mallein test. He suggests this as the reason for the positive non-specific reaction reported in I.—D. SLAVIN.

PULLINGER, E. J. (1938). **Induced Tissue Resistance to *Brucella abortus* Infection.**—*J. Path. Bact.* 47., 413-422. 3 figs. on 2 plates, 5 tables. [4 refs.]

The resistance of g. pigs to artificially induced *Br.a.* infection was markedly increased by the simultaneous injection of *Bacterium monocytogenes*. This increased resistance is thought to be due to the presence of macrophages which appear in response to the stimulus exerted by *Bact. monocytogenes*.

PIROSKY, I. (1938). Sur les propriétés immunisantes antitoxiques et anti-infectieuses de l'antigène glucido-lipidique de *Pasteurella aviseptica*. [**The Immunizing Properties of the Glucido-Lipoid Antigen of *Past. aviseptica***].—*C. R. Soc. Biol. Paris.* 127. 966-969. [5 refs.]

Thirty-six mice were injected intraperitoneally at six-day intervals with the glyco-lipoid endotoxin of *Past. aviseptica*, in doses rising progressively from 0.005 mg. to 0.25 mg. (2.5 times the M.L.D.). Of the 32 survivors, 14 were injected with even higher doses and one survived ten times the lethal dose. The other 18 immunized mice survived suspensions in mucin of live *Past. aviseptica* in doses which were lethal to control mice. P. concludes that the active method of immunization used is no more effective than the passive method described in a previous article [*V. B.* 8. 712.], and that the injection of endotoxin conferred specific resistance to infection.—R. O. MUIR.

MEYER, K., & PIC, A. (1937). Anticorps tuberculeux lipo-polysaccharidiques. [**Tuberculous Lipo-Polysaccharide Antibodies**].—*Ann. Inst. Pasteur.* 59. 594-609. 9 tables. [16 refs.] [See also *V. B.* 8. 649].

The authors prepared special rabbit immune sera by the injection of aqueous extracts of heat-killed tubercle bacilli and, by a special process, "dissociation liquids", respectively lipid and protein in character, derived from a kaolin-

antigen-antibody mixture, all these being used in a series of antigen absorption experiments which are tabulated. They conclude from their results that lipid and polysaccharide antigens are not present in a pure state in tubercle bacilli, but attached to proteins, forming a glyco-lipo-protein antigen complex. This induces the formation of a bivalent serum antibody with lipid and polysaccharide valencies, the former of these being complementophilous. The antibody has a very feeble affinity for the monovalent polysaccharide antigen.—C. V. WATKINS.

## DISEASES, GENERAL

STORDY, R. (1938). **Animal Husbandry in Peru.**—*Vet. J.* **94**. 233-252.

S. gives an account of the steps taken since 1921 in the improvement of the sheep stocks on the high plateaux (13,000 feet) of the Peruvian Andes. Rams imported for grading purposes withstood the high altitudes well after a preliminary sojourn at the lower levels. Improvement schemes for cattle, horses and poultry proved unsuccessful, since imported animals failed to become acclimatized to the peculiar conditions existing at the high elevations. A veterinary laboratory was established in 1928, and its chief work has been the manufacture of lamb dysentery serum and a campaign against blackleg. Descriptions of the following diseases peculiar to the region are given:—“brisket disease” of cattle, “alpaca disease”, dysentery in young alpacas, and sarcoptic mange in llamas. “Brisket disease” occurs in imported cattle taken to mountainous areas, and is characterized by general febrile symptoms and cardiac distress. General oedema follows, and is particularly prominent in the dewlap. Death occurs from heart failure. “Alpaca disease” is not described.—N. J. SCORGIE.

I & II. KAURA, R. L. (1937-38). **Common Contagious and Parasitic Diseases of Poultry in India and their Control (Parts I and II).**—*Agric. Live-Stk India*. **7**. 745-755, and **8**. 26-27. 21 figs. on 5 plates.

III. TUCKER, F. C. (1938). **Controlling Poultry Diseases.**—*J. Amer. vet. med. Ass.* **92**. 653-662.

I. The general measures applicable in disease control are enumerated, and a brief account is given of a number of specific diseases, *viz.* tuberculosis, pullorum disease, fowl typhoid, fowl cholera, coccidiosis, fowl pox and Newcastle disease.

II. This contains an account of spirochaetosis, and also particulars of a number of parasitic worms and the diseases they cause.

III. This is mainly a consideration of pullorum disease and coccidiosis, with experiences of their control. Conventional methods are dealt with.—W. J. I.

DE AQUINO, D. (1937). Pullorose e eimeridioses no Brasil. Verificações feitas no Estado de Santa Catharina e na Estação Experimental de Deodoro. [**Fowl Paratyphoid and Coccidiosis in Brazil**].—*Bol. Soc. brasil. Med. vet.* **7**. 9-23. [Numerous refs.]

A description of cases of pullorum disease and coccidiosis observed in Tubarão, State of Santa Catharina, with a review of the literature on Eimeriidae of animals found in Brazil up to 1935. No new material is given.—S. TORRES.

I. LLOYD, D. J. (1937). **Diseases of the Living Animal in Relation to Defects in Leather.**—*Preparation of Empire Hides and Skins*. pp. 3-7. London: Imperial Institute. [8vo] [3s. 6d.]

II. WILSON, P. W. (1937). **Defects due to Mechanical Damage to the Living Animal.**—*Ibid.* pp. 7-9.

I. The diseases of the living animal which affect the leather are discussed under the headings of "parasitic", "fungal", "virus", and "nutritional" conditions.

Those of parasitic origin are of greatest importance. Mange (sarcoptic and follicular), tick infestation, and warble fly disease cause vast economic loss throughout the world.

Only ringworm and streptothricosis are worthy of mention among the fungous diseases, and even they are not of great moment.

Of the virus diseases, rinderpest and the pox group cause most hide trouble.

Of the nutritional diseases, "cockle" and "rape blast" are mentioned as causes of abnormality in sheep skins: the former consists of nodules in the corium, and the latter causes defects in the grain of tanned skin. "Rape blast" occurs in New Zealand sheep, and is thought to be associated with the feeding of rape in large quantity.

II. Nearly all defects of this origin are avoidable. Barbed wire scratches especially cause serious damage. The provision of other kinds of fences and of rubbing posts and the destruction of ectoparasites are discussed and emphasized. Brand marks will not damage the hide if used on hoof, ear or cheek only. Curry-comb scratches, thorn scratches, goad marks and horn wounds can be avoided easily, the latter by the dehorning operation.—D. D. OGILVIE.

GREEN, R. G., BELL, J. F., EVANS, C. A., & MATHER, D. W. (1937). **Report of Minnesota Wildlife Disease Investigation 1936-1937.** pp. 177. Numerous tables, 1 chart. [4to] [Mimeographed].

An account is given of investigations into diseases of numerous animals and birds. In addition to routine reports, comprehensive surveys are made of the following:—"shock disease" (due to being caught in traps), tularaemia, skein-like mottling of the liver, lungworms, tapeworm cysts, and fleas and ticks in hares and rabbits; ulcerative enteritis, cannibalism, food poisoning, blackhead, and tuberculosis in quail; lead poisoning in ducks; tuberculosis in pheasants; roundworm in Hungarian partridges; botulism in various waterfowl, and intracellular distemper inclusions and "Chastek" paralysis in foxes [so called because it was first observed on the Chastek fox farm at Glencoe, Minnesota].—D. D. OGILVIE.

SHILLINGER, J. E., & RUSH, W. (1937). **Post-Mortem Examinations of Wild Birds and Mammals.**—*Misc. Publ. U.S. Dep. Agric.* No. 270. pp. 15. 6 figs.

A number of disease conditions of wild animals and birds are described.

Necrotic stomatitis occurred most frequently in ruminants on preserves or concentration areas where supplementary feeding was given. Rapid destruction of the soft tissues of the mouth, and later the teeth and jawbone was usual, but occasionally infection of the internal organs occurred.

Pneumonia was generally associated with some irregularity in the life habits of the animal, or with lungworms. Enteritis was a common cause of loss. It might be of parasitic, infectious, or digestive origin. Tularaemia affected many mammals and birds and was highly infectious to man. Botulism and lead poisoning were of greatest importance in waterfowl. Parasitism was a frequent cause of death, while starvation was often of moment as a contributory factor.—D. D. OGILVIE.

HUPBAUER, A. (1938). *Enzootická bronhopneumonia teladi. Influenza teladi? [Broncho-Pneumonia of Calves; Possibly a Type of Influenza].—Vet. Archiv. 8. 349-361. 2 tables. [9 refs.] [German summary].*

H. investigated broncho-pneumonia in calves [see *V. B. 8. 790*]. Filtrates of affected lung material set up infection in healthy calves, and it is inferred that the cause of the condition is a filtrable virus which infects *via* the nasal tract. Bacteria demonstrated were considered to be secondary invaders, but responsible for certain of the lesions. It is suggested that the condition should be regarded as a bovine influenza, although the general affection apparently only attacks very young animals. The investigation was on a very small scale, eight healthy calves only being used. Calves are said to be susceptible during the first six weeks of life and perhaps longer.—B. OSWALD (KRIŽEVCI).

I. MULHEARN, C. R. (1936). **Three-Day Sickness of Cattle.**—*Qd agric. J. 46. 782-787. 3 figs.*

II. MULHEARN, C. R. (1937). **Ephemeral or Three-Day Fever in Northern Queensland: Its Diagnosis and some Preliminary Investigations.**—*Aust. vet. J. 13. 186-191. [8 refs.]*

III. ANON. (1937). **Ephemeral Fever or "Three Day Sickness" of Cattle.**—*J. Dep. agric. Vict. 35. 130-133. 2 figs.*

I. M. describes the disease as it occurred in Queensland. Only bovine animals were affected.

II. M. describes the transmission of the disease by the inoculation of healthy cattle with the blood of affected animals. Transmission could not be effected by contact or by the inoculation of virulent blood which had been filtered through Seitz EK or K pads or Pasteur-Chamberland L2 candles. Horses, sheep, goats and small laboratory animals proved insusceptible when inoculated with material capable of producing the disease in cattle.

III. An account of the disease as described by authors in other countries is given, together with a brief description of its spread in Australia. In the latter country the morbidity rate in infected herds was as high as 80%, but the mortality rate was very low. The distribution of the disease suggested the presence of an insect vector.—T. S. GREGORY.

HOLZ. (1938). *Beiträge zur Pathologie des Zentralnervensystems. VIII. Uvula-fibrose. [Pathology of the Central Nervous System. VIII. Fibrosis of the Cerebellar Uvula].—Berl. tierärztl. Wschr. July 15th. 413-415. 5 figs. [See also *V. B. 8. 303*].*

An eight-year-old draught horse died with symptoms of colic, shown at autopsy to have been due to embolism from a parasitic aneurysm. The internal organs showed the changes commonly present in equine infectious anaemia, and the animal had been suspected of being a latent carrier of the virus for five years prior to death. The cerebellum showed multiple foci of fibrosis, especially around blood vessels in the region of the uvula. These changes are considered to have been the result of infection with the virus of infectious anaemia, and to represent the final stage of an original ependymitis granularis.—E. G. WHITE.

KINGSTON, G. S. (1938). **Equine Goitre.**—*J. R. Army vet. Cps. 9. 178-180.*

A number of cases of goitre in horses in Saugor, India, are described. Hypertrophy of the thyroid, rapid loss of condition on exertion, exhaustion, and harshness of the coat were the essential symptoms of the disease. Medicinal treatment was of no avail. A 14-year-old Australian gelding with unilateral enlargement of the

gland was subjected to thyroidectomy. Histological examination of the excised gland showed colloid goitre; blood analysis revealed a low iodine content. The condition did not improve.

K. suggests, as the probable cause of the condition, that the iodine was rendered inert in the bowel by combination with the calcium of the excessively hard water of the district. The absence of goitre amongst the human population indicates, however, that this is not the final solution of the problem.—D. D. OGILVIE.

SEDLMEIER, H. (1938). Enzootischer Virusabort bei Stuten. [**Enzootic Virus Abortion in Mares**].—*Münch. tierärztl. Wschr.* 89. 37-38. [3 refs.]

S. examined six equine aborted foetuses, all of which were 8-9 months old and appeared to be well developed. The placentas showed no pathological changes, and all the mares remained healthy after aborting. The only abnormalities discoverable in the foetuses were yellow discoloration of the conjunctiva, small necrotic foci and slight enlargement of the liver and spleen, hydrothorax, ascites, and petechiae in the lungs. Bacteriological examination of all organs was negative. From the clinical appearances the condition resembled that described by DIMOCK and EDWARDS in America [*V. B.* 7. 318.] and S. suggests a virus as the causal agent. No experiments were made to substantiate this view [see also *V. B.* 8. 716].—D. SLAVIN.

HAERID, O. (1937). Smitsom skjedekattarr som sterilitetsårsak hos storfe. [**Coital Exanthema as the Cause of Sterility in Cattle**].—*Norsk VetTidsskr.* 49. 371-378.

A description of temporary infertility in cows and bulls which was evidently due to genital vesicular exanthema. Only clinical observations were made.

—H. C. BENDIXEN (COPENHAGEN).

PAPP, G. (1937). Adatok a lovak ú. n. havivakságának kérdéséhez. [**Periodic Ophthalmia**].—*Állatorv. Lapok.* 60. 319-321.

As a result of observations on the horses of the Hungarian mounted police, P. concludes that periodic ophthalmia only occurs in districts with a wet soil. He suggests that it is caused by certain [unspecified] plants which occur in the hay crops in those areas. The disease was set up in 21 horses by feeding them on such hay, and recovery followed a change of the hay supply. He concludes that periodic ophthalmia is an example of plant poisoning, and not an infection. [The evidence provided is inadequate].—G. SÁLYI (BUDAPEST).

KOLLONAY, E. (1937). A lovak havivakságára vonatkozó gyakorlati megfigyelések. [**Periodic Ophthalmia in Horses**].—*Állatorv. Lapok.* 60. 220-223.

Periodic ophthalmia occurs more frequently in marshy districts than in dry districts and attacks horses whether in good or bad health. K. observed more cases in light coloured horses than in dark coloured ones. He believes that there is some hereditary disposition and that it is not a case of intoxication by protein decomposition originating in the intestines.—Z. DE CSUKÁS (MAGYARÓVÁR).

GUOTH, G. E. (1937). A szembetegségek és -hibák elbírálása szavatosság nézőpontjából, különös tekintettel az ú.n. havivakságra. [**Eye Diseases of Animals in Forensic Medicine**].—*Állatorv. Lapok.* 60. 89-92. [11 refs.]

ERDŐS, L. (1937). Megjegyzések Dr. Guoth és Dr. Kollonay közleményéhez a lovak szembetegségéről, illetőleg havivakságáról. [**Commentary on the Papers by Guoth and Kollonay**].—*Állatorv. Lapok.* 60. 89 and 220—on **Periodic Ophthalmia**].—*Ibid.* 272-273.

GÁBOR, G. (1937). Hozzászólás a havivakság kérdéséhez. [*Periodic Ophthalmia*].—*Ibid.* 273-275.

These papers give opinions on periodic ophthalmia from the aspect of warranty. The cause is unknown and diagnosis is often difficult. Erdős suggests that horses should be sold with a warranty stating that they are free from periodic ophthalmia, and that it should be fixed for a period of 60 days.

—Z. DE CSUKÁS (MAGYARÓVÁR).

- I. CLARK, H. C. (1937). **A Preliminary Report on Moon Blindness (Periodic Ophthalmia)**. pp. 10. [13 refs.] Panama: Gorgas Memorial Library. [4to] [Mimeographed]. [Reprinted in *Vet. Rec.* 49. 1322].
- II. DINSMORE, W. (1937). **Special Report from the Horse and Mule Association of America, to Veterinarians who Reported in October, November and December, 1937, on Moon Blindness they had Observed in 1936 and 1937**. pp. 4. 1 table. [8vo] [Mimeographed].
- III. SCHLOTTHAUER, C. F. (1938). **Recurrent Ophthalmia (Iridocyclitis)**.—*Vet. Med.* 33. 210-215. 6 figs. [Numerous refs.]
- IV. STUBBS, E. L., & RATCLIFFE, H. (1938). **Studies of Recurrent Ophthalmia of Horses**.—*Vet. Ext. Quart. Univ. Pa.* 38. No. 69. 3-12. 3 tables.

I. This is an account of a period of investigation into the cause, treatment and prevention of periodic ophthalmia in equines. The disease occurred in 109,739 horses and mules imported from the United States of America for use in the British army during the South African War. The cause of the disease has not yet been determined, though opinions have been expressed that the cause is either:—(a) bacterial infection; (b) vitamin A-deficiency; (c) a virus disease; (d) a parasitological agent, or (e) an allergic condition.

The disease first attacks the iris, and in later stages the whole eye becomes involved. The incidence of the disease is higher in the horse than in the mule; no curative treatment is known, but the mortality rate is insignificant.

C. believes that there is bacterial infection due to secondary invasion, that food deficiency may only be considered as a contributory factor, and that a virus agent may be implicated, as asserted by WOODS and CHESNEY [(1930). *J. exp. Med.* 52. 637.]; he does not support the view that the condition is due to parasitism or allergy.

II. In November, 1937, a questionnaire relative to periodic ophthalmia in equines was sent to veterinary surgeons in the U.S.A. In the 636 replies recorded, 8,993 cases were reported from various centres, indicating that the disease was widespread in the U.S.A., but most general in the east and middle west.

The result of the investigation shows that the disease was not prevalent on farms kept in a high state of fertility by dressing with lime and phosphates. It is suggested that on such farms the animals possess a sufficiently high resistance to throw off a possible infection.

III. This disease affects the iris, ciliary body and lens, the cornea and posterior structures of the eye being subsequently affected. The aetiology has not been definitely established.

The earliest symptoms noticed are conjunctivitis, followed by ptosis and miosis. In late stages of the disease the aqueous humor may contain blood or pus-like exudate. The iris becomes oedematous, and subretinal haemorrhages or inflammatory exudate may cause detachment of the retina. In treatment, ROSENOW and others [(1927-1928). *J. Amer. vet. med. Ass.* 71. 378, and 72. 419.] obtained good results with a vaccine. Good therapeutic effects were also obtained by giving foreign proteins in the form of intramuscular injections of sterile milk in conjunction with atropine, provided there were no permanent lesions affecting the eyes.

IV. Owing to an outbreak of ophthalmia in horses in south-east Pennsylvania in 1933 and 1934, a committee was formed to investigate the nature of the disease. As possible factors in the aetiology, soil, climate and food were considered.

In experiments carried out, rabbits, horses and calves were used. It was shown that the eyes of horses affected by periodic ophthalmia, contained a factor which might be passed through a Berkefeld N candle and which, when injected into the eyes of horses or of rabbits, would produce the acute stage of the disease; and injection of filtrate from the eyes of those experimentally affected also caused the disease in horses and rabbits.—BRENNAN DE VINE.

BLUM, H. F. (1938). **Domestic Animal Diseases Produced by Light.**—*J. Amer. vet. med. Ass.* **93**. 185-191. 1 fig. [Numerous refs.]

In an introductory discussion of the spectrum and the general effects of light upon living tissues, the more important diseases caused by photodynamic action are described. The effects have little or no connexion with sunburn. The wavelengths which produce the photodynamic effects vary with the sensitizing substance. A knowledge of the absorption spectrum of a photodynamic dye allows a forecast of the wavelength which will produce the photodynamic effects, and conversely, it is therefore possible to form an idea of the photodynamic substance. This is of value in establishing the aetiology of diseases produced by light.

B. enumerates three postulates to be fulfilled before a disease can be attributed to photodynamic action, *viz* :—(1) The disease must be reproduced by exposure to light, and the symptoms [unless very advanced] must disappear when the animal is protected. (2) A substance must be isolated, which will produce photosensitivity when injected. (3) The wavelengths which produce the photosensitivity after injection of the sensitizing substance must be the same as those which produce the disease.

St.-John's-wort poisoning, geeldikkop, buckwheat poisoning, and clover disease, are discussed in the light of these postulates, and a review is given of the general symptomatology of diseases caused by light.—D. D. OGILVIE.

ENGELHARDT, H. (1938). Ueber seuchenhaftes Auftreten von pockenartigen Ausschlägen einhergehend mit Dünndarm- und Leberveränderungen bei Schweinen. [**An Outbreak of Pox-Like Skin Disease Combined with Intestinal and Hepatic Changes in Swine**].—*Prag. tierärztl. Arch.* **18**. 99-104.

During the preceding four years E. encountered an increasing number of deaths among piglets occurring usually 8-14 days after purchase in the market. P.M. lesions included a greyish discoloration of the skin with pock-like scars and incrustations; the liver was usually of a firmer consistence than normal, and studded with yellowish lesions of varying size. The lesions were shown histologically to consist of degenerated liver cells surrounded by a fibrous capsule; in close relation to the latter were enormous numbers of organisms. A glomerulonephritis was usually present. Paratyphoid organisms could always be isolated from the liver.

The disease in piglets was always preceded by a similar condition in the sow, usually in the second week following parturition. The symptoms included a rise in body temperature and the appearance of pock-like lesions on the skin of the mammary glands which the owner often attributed to injury by the piglets. The lesions sometimes extended over the whole body, there was then a marked rise in temperature, and loss of appetite. At this time the sucking piglets develop lesions, first around the eyes and snout, and spreading later over the whole body. In

untreated cases the mortality in most litters was 80-100%. Sows and fattening pigs appeared always to recover within 1-2 weeks.

An autopsy on very young pigs usually revealed, in addition to the above lesions, fibrinous peritonitis and a diphtheritic deposit in the ileum. Paratyphoid organisms were especially numerous in the skin lesions.

Treatment of the piglets with 5-10 c.c. of the sow's blood injected subcutaneously together with a suitable polyvalent paratyphoid serum is stated to be successful. Vaccination of healthy piglets is suggested where there is danger of infection from neighbouring animals, and a more strict inspection at markets is recommended.—E. G. WHITE.

BASCHUNG, LANGERON, M., & LEBLOIS. (1937). Hyperkératose amiantacée équine localisée (fausse teigne amiantacée). [**Localized "Asbestos-Like" Hyperkeratosis Simulating Ringworm in a Horse**].—*Ann. Parasit. hum. comp.* 15. 544-551. 12 figs. on 2 plates.

A description of an apparently rather rare skin condition in a horse. The lesions consisted of two glabrous areas symmetrically placed below the eyes, and groups of plaques distributed over the neck, body and legs, on which the hair was short and covered by a greyish-white sticky exudate. The authors examined material for fungous parasites but could demonstrate none. They describe the characters of a diplococcus which was isolated from the lesions, but considered it was of no significance. The cause of the lesions was not determined.—N. J. S.

## NUTRITION IN RELATION TO DISEASE

MEISTERS, N. (1938). Untersuchungen über die puerperalen Stoffwechselkrankheiten. Die Azetonämie und einige andere Kuhkrankheiten. Prophylaxe der puerperalen Stoffwechselkrankheiten der Kuh. [**Puerperal Metabolic Diseases, Acetonaemia, and other Diseases of Cows, and their Prevention**].—*Dtsch. tierärztl. Wschr.* 46. 321-328. 3 tables. [16 refs.]

Observations were made on 17 cows with acetonaemia. The disease usually occurred in cows shortly after calving, in the early part of the year before the animals were turned out to grass. Symptoms set in gradually and took some weeks to become fully developed. Analyses of blood and urine showed that the pH of the blood was slightly below normal, with values lying between 7.70 and 7.55. The blood sugar was also reduced, varying between 59 and 54 mg. per 100 c.c. of blood, whilst the total blood acetone was greatly increased, varying between 84.8 and 15.8 mg. per 100 c.c. of blood with an average of 18.8 mg. The  $\beta$ -hydroxybutyric acid content of the blood was also increased, the average being 71.7 mg. per 100 c.c. On the other hand, the inorganic constituents of the serum were normal, thus differentiating acetonaemia from milk fever or puerperal eclampsia. The urine analyses showed high  $\beta$ -hydroxybutyric acid and acetone contents.

M. considers that acetonaemia is primarily the result of badly balanced rations, particularly feeding an over-abundant supply of concentrates, and also of lack of exercise. Good results were obtained by giving a diet of crushed oats and roughages. A mineral supplement was fed, and sodium bicarbonate was added to the drinking water. Daily exercise also proved highly beneficial.—J. A. NICHOLSON.

ERNST, W. (1938). Rhachitis und Osteoporose. [**Rickets and Osteoporosis**].—*Münch. tierärztl. Wschr.* 89. 277-281 and 290-294. [3 refs.]

A general discussion, containing no new material.—J. A. NICHOLSON.

WELLMAN, O., & URBÁNYI, L. (1937). Adatok az ásványi anyagforgalom zavarainak chemiai diagnosztizálásához. [**The Chemical Diagnosis of Disturbances of Mineral Metabolism**].—*Közl. Oesszehas. élet- és kórtan Köréből*. 28. 247-268. 8 tables. [7 refs.]

URBÁNYI, L. (1937). A csontok sóinak chemiai szerkezete. [**The Chemical Composition of Bones**].—*Állatorv. Lapok*. 60. 204-207. 2 tables, 2 charts.

These papers cover the same ground as others published elsewhere [*V. B.* 8. 112].—Z. DE CSUKÁS (MAGYARÓVÁR).

FOOT, A. S., & THOMSON, A. Y. (1938). **The Prevention of Anaemia in Pigs Reared Indoors**.—*J. Minist. Agric.* 45. 452-459. 1 fig., 4 tables. [8 refs.]

In controlled experiments on the prevention and cure of anaemia amongst young pigs it was found that administration of Fe to pregnant sows in the fortnight preceding parturition had no effect on the degree of anaemia induced in the piglets at two weeks old. The addition of Cu salts as well as Fe also had no apparent effect. Administration of Fe to the anaemic piglets will either cure or prevent the anaemia, but litters dosed with Fe during the second week were substantially heavier at weaning than those dosed during the third week. In the choice of Fe preparations, the pyrophosphate appears to have definite advantages over most other salts in that it is tasteless and has no marked astringent action.—ALFRED EDEN.

I. MURPHY, R. R., HUNTER, J. E., & KNANDEL, H. C. (1938). **The Effects of Rations Containing Gradient Amounts of Cod Liver Oil on the Subsequent Performance of Laying Pullets Following a Natural Infection of Coccidiosis**.—*Poult. Sci.* 17. 377-380. 3 figs. [6 refs.]

II. BECKER, E. R., & WILCKE, H. L. (1938). **The Influence of Dried Buttermilk in Rations on Fatality with Coccidiosis in Chicks**.—*Ibid.* 405-407. 2 tables. [3 refs.]

I. Measured amounts of cod liver oil ranging from 0.0625% to 1%, fed from time of hatch to 72 weeks of age, were added to otherwise adequate rations given to eight groups each of 50 White Leghorn pullets. Following an outbreak of caecal coccidiosis the body weight of all groups decreased, but the pullets on the higher levels of oil regained the weight more rapidly than those on the lower levels. The egg production and the mortality immediately following the infection also showed a definite relationship to the amount of oil fed; in the low-oil groups egg production decreased and mortality was higher. The pullets of all groups moulted but the groups fed with the high-oil diet did not go through as severe or as complete a moult as those on the low-oil diets.

II. Four groups each of 56 chicks were used for testing the influence of dried buttermilk on mortality in experimental caecal coccidiosis. Two rations of the ordinary type with 10% and 40% dried buttermilk respectively gave a higher mortality than one with no dried milk, although the latter did not provide such good growth. When the remainder of the ration consisted only of corn, oats and bran, the addition of 40% dried buttermilk did not result in a significantly higher number of fatalities, and, therefore, the authors consider that the increased mortality cannot be attributed solely to the buttermilk.—R. ALLCROFT.

TULLY, W. C. (1938). **A Nutritive Disease of Chicks Caused by Feeding Dried Eggs**.—*Poult. Sci.* 17. 855-868. 3 tables, 5 charts. [Numerous refs.]

Experiments are reported with 22 lots of chickens fed commercial dried egg and egg-white in which these products were used both as the only source of animal protein and with various supplements.

Poor growth and the pellagra syndrome in a severe form resulted from the feeding of either raw egg-white or dried egg-white in rations otherwise complete; even when supplements of yeast, milk, or combinations of these were given, growth was not good and the pellagra syndrome was still severe. When whole dried egg was fed at the same protein level, growth was much better and the pellagra syndrome almost absent.

Haemoglobin figures for chickens from seven lots showed that the range of the averages was from 4.9 to 8.9 g. per 100 c.c. The serum albumin and globulin contents of the chick blood was determined, and the results indicated that both the ration and the age of the birds has a marked effect on these two blood proteins  
—R. ALLCROFT.

MORGULIS, S., & OSHEROFF, W. (1938). **Mineral Composition of the Muscles of Rabbits on a Diet Producing Muscle Dystrophy.**—*J. biol. Chem.* 124. 767-773. 1 table. [13 refs.]

A marked increase in the Cl and Na and an enormous increase in the Ca content was observed in the muscles of dystrophic rabbits. The K content was greatly diminished and the changes in Na and K almost compensated each other. When the diet producing dystrophy was supplemented with wheat germ, the Ca and K levels soon returned to normal, as also did the Cl and Na content in two out of three dystrophic animals.—R. ALLCROFT.

JUKES, T. H., & BABCOCK, S. J., Jr. (1938). **Experiments with a Factor Promoting Growth and Preventing Paralysis in Chicks on a Simplified Diet.**—*J. biol. Chem.* 125. 169-181. 1 fig., 6 tables. [Numerous refs.]

Results of investigations on a nutritional paralysis produced in chicks by feeding a simplified diet show that there are two different forms of the same active factor or factors, since protection against paralysis was given by a fat-soluble fraction prepared from soya bean oil and by a water-soluble fraction prepared from fat-extracted alfalfa meal. The addition of alfalfa meal to the diet improved growth and prevented paralysis to a greater extent than did soya bean oil. Other fractions of the water-soluble extract of hexane-extracted alfalfa meal were investigated, but were not found to contain the protective factor.—R. ALLCROFT.

I. INSKO, W. M., Jr., LYONS, M., & MARTIN, J. H. (1938). **The Effect of Manganese, Zinc, Aluminium and Iron Salts on the Incidence of Perosis in Chicks.**—*Poult Sci.* 17. 264-269. 2 tables. [11 refs.]

II. LEMASURIER, H. E., & BRANION, H. D. (1938). **A Radiological Study of the Development of the Fowl to Six Weeks of Age on a Mineral Deficient Ration.**—*Ibid.* 270-275. 1 fig., 7 plates, 1 table. [3 refs.]

I. The protective action of manganese against slipped tendon when added to the basal ration in the form of manganese sulphate at a level of 30 p.p.m. is evident from the data. These results confirm the work of WILGUS, NORRIS and HEUSER [*V. B.* 8. 244 and 722.], but do not agree with their report on the protective action of aluminium and zinc. The addition of 30 p.p.m. of Al, Zn and Fe to a ration containing 0.61% Ca, 0.49% P and 4.5 p.p.m. Mn gave no protection, but rather increased the incidence of slipped tendon.

II. Two groups each of 50 Barred Plymouth Rock day-old chicks were fed the Ontario Agricultural College Baby Chick Cafeteria ration for a period of six weeks, the control group receiving a mineral supplement of bone-meal, oyster shell and fine grit. X-ray examinations showed that two distinct types might be found in a flock on a mineral deficient ration:—

"(1) a small bird that has utilized the available mineral to develop a comparatively normal skeleton, but having a skeleton only comparable in development to that of a bird of the same weight fed on a normal ration, and (2) a moderately large bird that has grown at the expense of its skeletal structure, which shows typical rachitic lesions."

The series of X-ray plates indicate that the degree of severity of rickets is directly proportional to the amount of growth which the bird has achieved.—R. A.

CAPODAGLIO, A. (1938). Intorno alla genesi alimentare della distrofia tossica del fegato dei suini. [**Nutritional Hepatic Dystrophy in Swine**].—*Clin. vet., Milano*. **61**. 94-97. [6 refs.]

C. describes briefly toxic liver dystrophy in fattening pigs, and suggests that it may be due to the excessive use of maize, which is deficient in vitamin B, in the amino acid, lysine, and in tryptophane, the latter being essential for digestion of proteins.

McCULLOUGH, N. B. (1938). **Vitamin C and Resistance of the Guinea Pig to Infection with *Bacterium necrophorum***.—*J. infect. Dis.* **63**. 34-53. 9 figs. [Numerous refs.]

M. describes the relation of vitamin C-deficiency in the g. pig to infection with various strains of *Fusiformis necrophorus*. In extremely scorbutic g. pigs, avirulent human strains which failed to produce lesions in normal g. pigs produced minor abscesses. These strains had no effect on g. pigs with subacute scurvy. Administration of vitamin C had a curative effect on infected scorbutic g. pigs.

With more virulent animal strains, a more severe degree of infection occurred in scorbutic g. pigs. Severe scurvy was necessary before a decrease in resistance to this organism could be demonstrated.—D. L. HUGHES.

MIRIMANOFF, A. (1938). Vitamine C et chlorophylle. [**Vitamin C and Chlorophyll**].—*C. R. Acad. Sci., Paris*. **206**. 766-768.

An analysis of different parts (leaves, stems, flowers, and bulbs) of vegetables and flowers showed that there is no correlation between the vitamin C content and the presence of chlorophyll.—R. ALLCROFT.

## PUBLIC HEALTH

RABAGLIATI, D. S. (1937). **Present-Day Administration of the Milk and Dairies Legislation as Influenced by the Work and Teachings of Sir John M'Fadyean**.—*J. comp. Path.* **50**. 351-355. [7 refs.]

M'FADYEAN was the first to bring to the notice of British veterinarians the diagnostic value of Koch's tuberculin, and he predicted its use for the eradication of bovine tuberculosis.

In collaboration with SIMS WOODHEAD, in 1891, he issued a warning concerning the use for children of milk from cows with tuberculous udders, and stressed the great necessity for the routine inspection of dairy cattle and other food animals.

He pointed out the importance of bovine TB. from the agricultural aspects, and challenged Koch's assertion that bovine TB. was not communicable to man.

R. refers to M'FADYEAN's published work on TB.—H. E. BYWATER.

I. RICE, J. L. (1936). **The Future Milk Supply—A Challenge**.—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936*. pp. 175-184.

II. GODFREY, E. S., JR. (1936). **The State's Place in the Program of Milk Sanitation.**—*Ibid.* pp. 185-188.

I. R. gives a summary of the improvements in the standard of New York milk since 1901; 99% of the milk is now pasteurized, the infant death rate has fallen from 12.6% to 4.7%, and the typhoid death rate from 20.5 per 100,000 to 0.5 per 100,000. On the other hand, he considers that the average bacterial count is still far too high, and that the flavour and purity of the milk should be further improved, as the milk consumption in New York City is below the desired maximum.

II. On his appointment as Commissioner of Health for New York State, G. outlined his policy in this general article on milk control. In his view the only safe milk is pasteurized milk, and he aims at increasing the efficiency of pasteurization. The State is now responsible for the approval of pasteurizing plants, and this work is carried on by engineers as well as by milk inspectors. The article is written mostly from the administrative view point.

I. PINCUS, S., ABRAHAM, S., & TIEDEMAN, W. D. (1936). **Comparison of Certain Tests Applicable to Raw Milk as Received at Plants.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 35-55. 6 tables.

II. RAMSDELL, G. A. (1936). **The Resazurin Test for the Sanitary Condition of Milk.**—*Ibid.* pp. 57-72. 2 figs., 3 tables. [6 refs.]

III. GILCREAS, F. W., & DAVIS, W. S. (1936). **Investigation of the Amylase and Phosphatase Tests as an Indication of Pasteurization.**—*Ibid.* pp. 73-94. 1 fig. on 1 plate, 12 tables, 1 graph. [5 refs.] [Also appeared in *Proc. int. Ass. Milk Sanit. 1936.* pp. 15-82].

I. The authors describe experiments carried out to decide on a quick and reliable test for raw milk as it arrives at the receiving plant, preferably a simple test that could be done without a great deal of apparatus or technical supervision. The odour test, strainer dipper test, sediment test, temperature test, direct microscopic bacterial count, plate bacterial count, methylene blue reduction test, bromocresol purple test and curd test were compared. Results showed that the microscopic count was the most reliable test, but that it did not detect dirty milk. In practice it has the disadvantage of requiring considerable equipment, and a skilled man to carry it out. The methylene blue reduction rate was shown to have no close relation to the bacterial count. The most effective convenient test was found to be the odour test; this detected about 70% of the high-count milk, and rejected no more healthy milk than the methylene blue test. There seems to be no difficulty in training ordinary Department of Health field men to carry out this test; used in conjunction with the strainer dipper test for dirt detection, it should be of great value in milk control work.

II. An account of experiments to determine the comparative value of the resazurin and methylene blue tests for the sanitary condition of milk. The resazurin test is speedier, as it will give results in one hour, whereas the methylene blue test, on the other hand, requires five hours. For this reason the resazurin test gives a more accurate estimation of the original bacterial contamination, as it is not influenced by the multiplication that must take place during prolonged incubation. Pathologically or physiologically abnormal milk can be detected with greater accuracy by the resazurin test; this test has also proved to be more effective in demonstrating the presence of slowly-reducing organisms, as it reduces at a higher oxygen level. Full tables are given, showing classifications of milk of known quality by the two tests.

III. The authors undertook a series of experiments to demonstrate the value of the amylase and phosphatase tests for the efficiency of pasteurization, the

undestroyed amylase being detected by iodine solution, and the phosphatase by the phenol liberated from added disodium phenyl phosphate. They found that although in general the amylase test distinguished heated from unheated milk, it was not always reliable, and could not accurately detect differences in the degree of pasteurization. The phosphatase test was far more satisfactory; it could differentiate between treated and untreated milk, estimate correctly the degree of treatment of 97 % of the samples to which it was applied, and detect as little as 0.1 % of added raw milk. The article contains full tabulated results of the experiments, and should be consulted for details of procedure.

BREED, R. S. (1936). **Desirable Changes in Standard Media and Incubation Temperatures.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 107-121. 2 figs.

The author states that the chief need of milk hygiene in Europe is to eliminate the dangerous pathogenic organisms from the milk, while in the U.S.A., owing to the low incidence of TB., the aim is rather to keep the general bacterial count low. B. points out that for this purpose the standard meat extract agar used in the U.S.A. is not the most suitable medium. He suggests that this medium should be replaced by a tryptone-glucose skim-milk agar, and that the temperature should be changed from 37°C. to 32°C. The article includes charts of experiments he carried out on this work; according to these charts a noticeably higher average count is obtained with the skim-milk agar at 32°C. than under any other conditions.

NEVEU, R. (1937). Le rôle du lait et de ses dérivés dans l'étiologie de certaines épidémies de fièvre typhoïde. [**Milk and Milk Products and Enteric Fever**].—*Rev. Microbiol., Paris*. 3. 194-197. [15 refs.] [Copied verbatim from *Bull. Hyg., Lond.*, 12. 859. Signed W. G. SAVAGE].

The author points out that while water and shellfish are well recognized as vehicles for the transmission of typhoid fever, there is a danger that milk is inadequately appreciated as a means of spread. He instances a number of milk-spread outbreaks in France and other countries. One outbreak in which he assisted was extensive and was traced to the milk vessels being washed in a tank, the same tank being used to rinse the clothes of the milk dealer's wife who had suffered from an attack of typhoid fever. He discusses the danger of unrecognized typhoid and paratyphoid bacillus carriers and mentions another outbreak in which he was concerned due to an unrecognized paratyphoid carrier. He considers that both pasteurization and rigorous control over the milk supply are required. [No outbreaks due to milk products are mentioned although indicated in the title.]

HENNINGSEN, E. J., & ERNST, J. (1938). **Milk Epidemic of Angina, Originating from a Cow with Mastitis and due to *Streptococcus pyogenes* (Lancefield Group A).**—*J. Hyg., Camb.* 38. 884-891. 1 fig. [9 refs.] [See also *V. B.* 8. 681].

The authors describe an explosive epidemic of sore throat in a community of 750, involving 100 cases nearly half of which occurred within three days. The outbreak was moderately severe, but there were no deaths. A1 save one patient had consumed unpasteurized milk from a common source.

A streptococcus was isolated from 74 of the patients examined and also from three persons handling milk. A cow with a slight degree of mastitis was found to be excreting *Str. pyogenes* (Lancefield Group A), and this organism was isolated from 17 of the patients. It was assumed that infection passed from milkers to the cow, and thence to the milk supply.—H. E. BYWATER.

HUCKER, G. J., & MARQUARDT, J. G. (1936). **The Survival of *Streptococcus Pyogenes* in Cheddar Cheese.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 171-174. 2 tables.

The authors describe experiments which demonstrate that *Str. pyogenes* can survive for some months in cheese cured at 40°F., but not if the curing temperature is raised to 60°F. During the course of the investigations an epidemic of milk-borne sore throat occurred, and the authors found that cheeses made from the contaminated milk contained viable *Str. pyogenes*.

LEHMKUHL, H. W. (1936). **Use of Chlorine Solutions on the Dairy Farm.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 181-152. 2 tables.

L. deals with some of the problems associated with chlorine disinfection on the dairy farm, and the article is written mainly for dairymen and inspectors. He points out that in many cases the solutions are left so long without renewal that they become a fresh source of bacterial contamination for the milking utensils. Soap should never be used for cleaning utensils before they are chlorinated, as it will interfere with action of the chlorine. Under certain conditions solutions may lose strength; to control this L. suggests the use of the starch-iodide test to determine the chlorine concentration.

VON OSTERTAG, R. (1936). **Die Ausführungsbestimmungen A zum Reichs-Fleischschau-Gesetz in der Fassung der bisher ergangenen Bekanntmachungen des Reichskanzlers und Verordnungen des Reichsministers des Innern. [Administrative Instructions A for the Reich Meat Inspection Law, Germany].** pp. 233. 4 figs., 3 tables. Berlin: Richard Schoetz. [7th Edit.] [8vo].

The author gives the whole of the German meat inspection act with explanations, and thus the book forms a guide for meat inspectors, not only in Germany, but also in other countries. There is a very extensive and lucid description of meat poisoning and the procedure of its detection and prevention, and an account of NIEBERLE'S doctrine on the pathogenesis of tuberculosis.

A chapter deals with air raid precautions in abattoirs after gas attack. Lungs and tracheas of affected animals should be seized; meat of such animals should only be used when cooked, and in the case of dressed carcasses so exposed 1 cm. of the outermost muscle-layer should be removed. The carcasses should be covered with grease-proof paper or cellophane to protect them against gas. The author gives as appendixes several official forms as used in the statistical surveys of records in Germany, also instructions for the freezing of beef infested with *Cysticercus bovis*, for taking and despatch of meat samples for bacteriological inspection, and also for the preparation of culture media for this purpose. A table is given indicating the various forms of TB. and the manner in which diseased meat should be dealt with.—M. F. BENJAMIN.

HAINES, R. B. (1938). **Observations on the Bacterial Flora of the Hen's Egg, with a Description of new Species of *Proteus* and *Pseudomonas* Causing Rots in Eggs.**—*J. Hyg., Camb.* 38. 338-355. 9 tables. [16 refs.]

A study was made of rots in eggs. 98% of the whites of fresh eggs and 93% of the yolks examined were sterile. Rots were grouped according to colour. Black rot was due mostly to *Proteus* and, to a lesser extent, to species of *Pseudomonas*. Red and green rots were caused by particular strains of *Pseudomonas*. Fishy odour was due to species of atypical coliform bacilli, whilst "cabbage water" smell was due to *Pseudomonas* species.

Coliform and *Proteus* organisms isolated are described. The strains of *Proteus* investigated differed from *Pr. malanovogenes*, which causes black rot in South African eggs.—H. E. BYWATER.

### THERAPEUTICS

HOLMES, F. (1937). **Mass Treatment of Oriental Sores.**—*J. R. Army med. Cps.* **69.** 258-260.

Apart from human cases, mention is made of the treatment of 12 dogs affected with cutaneous leishmaniasis of the face, by the local application of 20%  $\text{CuSO}_4$  in 5% carbolic acid on four successive days, with repetition after 7-10 days if necessary. The ulcers healed in one month. The work was done in Baluchistan.—J. E.

WILLE, J., OCAMPO, J. A., WÉBERBAUER, A., & SCHOFIELD, D. (1937). El cubé (*Lonchocarpus micou*) y otros barbasco en el Perú. [**Cubé and other Barbasco Plants in Peru**].—*Bol. Estac. exp. agric. Minist. Fom. Perú.* No. 11. pp. 117. 23 plates. [Numerous refs.] [Copied verbatim from *Rev. appl. Ent.* **25.** 284-285].

Part of this paper deals with the use of cubé (*Lonchocarpus micou*) in dips against *Melophagus ovinus*, L., and *Sarcoptes* sp. on sheep, *Haematopinus eurysternus*, Nitzsch, on cattle, *H. suis*, L., on pigs, and a species of *Psoroptes* on alpaca in Peru. In 1935 more than 300,000 sheep were treated with cubé dip in the Junín region, and 150,000 in that of Puno. The dips were obtained either from an extract prepared by soaking the chopped roots in water for 48 hours, or from a powder finely ground so that 85 per cent. passed a sieve of 0.074 mm. mesh. Their practical application was studied in 1936 by J. F. Mitchell, who stated that the powder yielded a dip that was more saponaceous, and therefore penetrated better, than that from the extract. Dips made with the powder did not keep for more than 48 hours, a disadvantage owing to the numbers of animals to be treated, whereas those made with the extract kept for up to a week. The addition of  $\frac{1}{2}$  lb. soap per 100 U.S. gals was recommended, and also that of  $\frac{1}{2}$  lb. sodium carbonate to counteract the hardness of the water. For complete control of the parasites, cattle usually required two dips, with about a fortnight's interval, twice a year, and sheep the same, except when seriously infested, in which case a third pair of dips was necessary.

The effective concentrations of ground root containing 6.8 per cent. rotenone, and of extract containing 5.5 per cent. rotenone were, respectively, 1 : 2,000 and 1 : 10,000 for *M. ovinus*, 1 : 3,000 and 1 : 15,000 for *H. eurysternus*, 1 : 2,000 and 1 : 8,000 for *H. suis*, and 1 : 1,000 and 1 : 5,000 for *Sarcoptes* sp. and *Psoroptes* sp. The ground root and the extract were equally effective, and were in no way inferior to other dips.

In preliminary tests, cubé root containing 5 per cent. rotenone had no effect on the larvae of *Anopheles pseudopunctipennis*, Theo., after 15 hours, when used at a concentration at which it killed fish in 30 minutes.

HARWOOD, P. D., & JERSTAD, A. C. (1938). **An Improved Critical Test for Poultry Taeniocides.**—*Poult. Sci.* **17.** 295-297. 1 table. [1 ref.]

Tests for poultry taeniocides are liable to unavoidable inaccuracy so long as birds with an unknown number of worms are treated.

In this article the following standard test of a remedy is described : birds are

artificially infested with a single tapeworm, and the result determined by P.M. examination. An experimental determination, using this method, is described in detail.—D. D. OGILVIE.

KAWAI, T. (1937). **Experimental Studies on the Clonorchicidal Effect of Gentian-Violet. A Supplement: Value of Wakeshima's Egg-Counting Method as a Judgement of Anthelmintic Effect of Drugs against *Clonorchis sinensis*.**—*J. med. Ass. Formosa*. 36. 923-933. [In Japanese: abst. from English summary p. 934].

K. studied the effect of gentian-violet given orally to dogs, using the egg-counting method. In light infestations (worm estimate 49) 18 mg. per kg. body weight administered every three days (total dose 1.2 g.) reduced the number of worms by 61%; in a moderate infestation (worm estimate 333) 18-20 mg. per kg. body weight daily for 19 days (total 3.04 g.) reduced the infestation by 42%, and in heavy infestations (worm estimate 1,215) 120 mg. daily reduced the number of worms by 25% in 30 days (total dose 3.6 g.) and by 36% in 45 days (total dose 5.4 g.). He concludes that gentian-violet given orally is effective against *Clonorchis*, particularly in light infestations, and that its anthelmintic property is in direct proportion to the dose given.

BILD, C. E. (1938). **The Treatment of Heart-Worm Infestation.**—*J. Amer. vet. med. Ass.* 93. 179-184.

Before treatment is commenced, a comprehensive clinical examination of the patient is made. Dogs with persistent albuminuria, polyuria, heart-worm toxæmia, debility or senility, or whose urine has a low sp. g., make poor subjects. The patient is rested for about a week and given tonics. Filsol and foudadin seem nearly equal in immediate value, but filsol has the merit of giving a sterilizing cure, whereas with foudadin, relapse may occur after some months.

In average cases filsol is given intravenously every day for about two weeks. Initial doses average 1 c.c. per 25 lb. body weight, but later 1 c.c. per 12 lb. body weight may be given, with 5 c.c. as a maximum dose. Reactions due to antimony poisoning can occur, but unless exceptionally severe they can be controlled, and the mortality from the treatment kept below 2-3%.—D. D. OGILVIE.

I. BECKER, R. B., & GADDUM, L. W. (1937). **The Composition of Limonites Effective and Ineffective in Correcting "Bush-Sickness" in Cattle.**—*J. Dairy Sci.* 20. 787-789. 1 table. [4 refs.]

II. NEAL, W. M., & AHMANN, C. F. (1937). **The Essentiality of Cobalt in Bovine Nutrition.**—*Ibid.* 741-753. 3 figs. [Numerous refs.]

I. Spectrographic analysis was made of two samples of New Zealand limonite, one effective and the other ineffective in curing "bush-sickness". Of the "trace elements" found, the effective one contained 50 p.p.m. Co, but there was no Co in the ineffective sample, although this contained 100 times as much Ba as the effective one; the Cu contents of the two samples were similar. The figures found are in fair agreement with those obtained by chemical methods.

II. Jersey calves were fed from birth on a ration obtained from "salt sick" areas. The ash of the fodder showed spectrographically complete absence of Co. Gradually a malnutrition was produced, reflected in inappetence and accompanying effects on growth, and there was evidence of a microcytic, hypochromic anaemia, although this was not very marked. The condition was aggravated by the use of an iron-copper supplement, but was prevented or cured by the daily oral administration of 5-10 mg. Co. Besides the general symptoms of malnutrition and lympho-

cytosis, P.M. examination showed pigment deposition (haemosiderosis) in the liver and spleen, and fibrosis and fatty changes in the liver, whilst the heart showed signs of myocardial degeneration and fibrous infiltration. Owing to the difficulties of measuring chemically the normal Co content of rations, biological response is given as the sole diagnostic method at present.—ALFRED EDEN.

## POISONS AND POISONING

MARCOVITCH, S., SHUEY, G. A., & STANLEY, W. W. (1987). **Cryolite Spray Residues and Human Health.**—*Bull. Tenn. agric. Exp. Sta.* No. 162. pp. 46. 6 figs., 12 tables. [Numerous refs.]

This is an account of a study on the toxicity of fluorine in drinking water, as compared with that of cryolite in spray residues used to disinfest growing plants, experiments being carried out on white rats. It was ascertained that the smallest amount of fluorine, as cryolite, which would cause mottling in teeth, was 7 mg. per kg., while arsenic trioxide will interfere with growth in amounts as small as 0.0015 mg. per kg.

The results of the experiments indicated that fluorine-sprayed fruits or vegetables cannot be injurious to human health. [Though no tests were carried out on farm animals with sprayed greenstuff, the bulletin contains a great deal of information on fluorine tolerance and toxicity in general].—BRENNAN DEVINE.

DILDINE, S. C. (1938). **The Symptoms, First Aid, Treatment and Prevention of Gas Casualties in Horses and Mules.**—*Vet. Bull. U.S. Army.* 32. 167-191. 1 table. [8 refs.]

D. gives statistics of animal losses in the Great War due to poison gases. He remarks that the figures are probably unreliable, as many cases of broncho-pneumonia, etc., were not recognized as being due to gas; he also speaks of skin lesions being sometimes wrongly diagnosed as mange. [This suggestion might be contested, at least in connexion with some armies]. He goes on to deal in detail with the chief poison gases, giving their characteristic odour, the symptoms they produce, and the treatment required. It is generally considered that horses and mules are little affected by the lacrimators, but D. points out that few observations have been made on the mule. Slight conjunctivitis may be caused by high concentrations. Some of the irritant arsenical smokes seem to cause irritation of the nasal mucosa in horses, but the action of others is unknown; D. urges that experiments should be carried out to determine the toxicity for horses and mules of forage and water contaminated by these smokes. Little is known of the treatment of equines for HCN gas poisoning, but D. suggests that the treatment for man (amyl nitrite by inhalation and heart stimulants) might be modified for animals. Horses can be killed by an atmosphere containing 0.05% CO<sub>2</sub>; treatment is by artificial respiration and oxygen administration.

Horses show much the same susceptibility to the lung irritants as do human beings. Injured animals must be rested and kept warm, and oxygen treatment should be given in proportion to the gravity of the condition. Heart stimulants should also be given. The first 48 hours decide the outcome, and survivors recover in 1-4 weeks. The effects of chloropicrin have not been observed in large animals.

The skin, eyes, digestive tract and respiratory tract of horses are attacked by mustard gas. Immediate decontamination where possible is the first essential, and can be carried out with Dakin's solution or 20-80% chloride of lime. Eyes should be washed with a 3% boric acid solution. The naso-pharynx, oesophagus,

and stomach should be irrigated with a 3-4% solution of sodium bicarbonate; an emollient should be given to soothe the inflamed gastric and intestinal membrane, and the animal should be given cold water and soft foods. For greatly swollen mucous membranes a weak solution of adrenalin may be used. For throat and lung injuries, turpentine or tincture of benzoin inhalations should be given, and oxygen and heart stimulants administered where necessary.

Skin lesions caused by lewisite are more serious, and there is great danger of arsenic poisoning. Lesions should be soaked in 5% NaOH, and then washed with soap and water.

As a preventive, D. recommends gas masks, a treated boot and foot pad, and coverings for other parts of the body; he also suggests that gas-proof stables might be possible for collective protection. He points out that in a future war it may be necessary to safeguard meat-producing domestic animals from gas attacks. A full classification table of the gases is included.

ANDREONI, R. (1988). Gli animali in guerra aerchimica. [**Animals in Chemical Warfare**].—*Profilassi*. 11. 97-102.

In any future war, the maintenance of food supplies will be of the utmost importance, and veterinarians must be competent to arrange for the protection of animals against air attack, to treat animals suffering from the effects of gas, and to know how to decontaminate fodder and other material.

Mustard gas is the one most likely to be used. If the concentration of gas has been weak, symptoms of poisoning may not appear for some days; this is also the case after the ingestion of contaminated food, which eventually causes a severe gastro-enteritis. The gas produces its effects on the skin within a few minutes in horses, but in cattle, sheep, dogs and human beings effects may not be seen for some hours. On entering the body, the gas combines with the water of the tissues and splits up into inert substances and hydrochloric acid. It is the latter substance which is responsible for the oedema, inflammation, and necrosis of the tissues. The symptoms produced depend largely on the amount of gas which has entered the body, so that exertion on the part of the animals should be avoided as far as possible. Rapid, deep respirations fill the lungs with gas in a short time, and this should be avoided; it is better to drive animals out of an affected area slowly.

Phosgene produces symptoms similar to those of mustard gas poisoning, and Lewisite gives rise to symptoms of arsenical poisoning. Chlorine is not likely to be used, and the tear gases do not have very serious effects.

If possible every farm, and certainly markets, abattoirs and other places where large numbers of animals are likely to be gathered, should be provided with fire-fighting appliances, and the buildings strengthened to resist high explosive bombs. A plentiful supply of bleaching powder should be kept ready for dressing affected animals and for decontaminating the fodder and buildings.—J. A. N.

MATHEWS, F. P. (1937). *Lechuguilla (Agave Lecheguilla) Poisoning in Sheep, Goats, and Laboratory Animals*.—*Bull. Tex. agric. Exp. Sta.* No. 554. pp. 86. 10 figs., 9 tables. [Numerous refs.]

After a review of the literature on the several photosensitization diseases, a description is given of the symptoms and pathology of naturally occurring lechuguilla poisoning ("swellhead", "goat fever" or "lechuguilla fever").

In the experimental production of the disease, sheep and goats were fed on the ground-up green leaves of the plant, or water extracts of them, and exposed to sunlight for regular periods daily. Icterus and liver and kidney lesions similar to those seen in the natural disease were constantly produced, but some difficulty

was experienced in producing the skin and connective tissue lesions of the head.

Experiments on rats fed alcoholic extracts showed that for the production of the complete clinical picture two different agents were necessary, one an unidentified photosensitizer and the other a hepato-nephro-toxin described as a saponin.

—F. J. ANDREWS.

ROGERS, C. F., LARSON, A. H., & SPRACHER, M. L. (1937). **Variations of the Hydrocyanic Acid Content of Sudan Grass from a Single Lot of Seed.**—*J. Amer. Soc. Agron.* 29. 865-876. 3 figs., 3 tables. [7 refs.]

Five acres of land were planted with pure sudan grass seed, and a close study was made of plant variations in the resulting crop, uniform portions of leaves being taken for the estimation of the HCN content. Among the plants of widely different characters produced on the land there was little variation in HCN content, which was not at a dangerous level, and the authors suggest that any intoxication caused in animals by eating sudan grass must be due to some agent other than hydrocyanic acid.—F. J. ANDREWS.

SMITH, W. A., & BRINK, R. A. (1938). **Relation of Bitterness to the Toxic Principle in Sweetclover.**—*J. agric. Res.* 57. 145-154. 3 tables. [10 refs.]

When common sweetclover (*Melilotus alba*) is stacked at about 50% moisture and allowed to heat, it gives a hay which, when fed to rabbits, induces the symptoms of sweetclover disease found in cattle, the characteristic of which is low blood clotting power. A non-bitter species, *M. dentata*, does not become toxic on being similarly stacked. The clotting power of the blood is not altered by feeding coumarin, the bitter principle, or by spoiled alfalfa hay, but the mixture becomes toxic on being allowed to heat. It is suggested tentatively that coumarin reacts with some other constituent of the plant tissue, giving rise under suitable conditions to the specific substance responsible for "sweetclover disease". Neither melilotic acid nor coumaric acid will induce the disease. The development of non-bitter forms of sweetclover is suggested for improving the palatability and obviating the disease hazard associated with the feeding of improperly cured hay.—ALFRED EDEN.

THORP, F., JR., DEEM, A. W., HARRINGTON, H. D., & TOBISKA, J. W. (1937). ***Suckleya Suckleyana*, a Poisonous Plant.**—*Tech. Bull. Colo. agric. Exp. Sta.* No. 22. pp. 19. 10 figs., 3 tables. [3 refs.]

Occasional losses amongst cattle grazing in the plains section of N. E. Colorado were found to be due to ingestion of *S.s.*, a succulent plant growing in water holes and irrigation reservoirs. Analysis showed the plant to be cyanogenic, with HCN concentrations of from 2.86-4 mg.%. Feeding experiments confirmed the toxic nature of the plant, although under experimental conditions animals refused to eat the plant voluntarily. By force-feeding, the plant was found to be toxic for cattle, sheep, rabbits and g. pigs; symptoms of poisoning appeared rapidly, followed either by death or by quick recovery, depending upon the quantity ingested. The use of  $\text{NaNO}_2$  and  $\text{Na}_2\text{S}_2\text{O}_8$  intravenously brought about rapid recovery in a heifer which was showing signs of HCN intoxication after being forcibly fed with the plant.—ALFRED EDEN.

BESSE. (1938). Empoisonnement par le "N'Daka" (*Canthium* sp.). **[Poisoning of Cattle by "N'Daka" (*Canthium* sp.).]**—*Bull. Serv. zootech. Epiz.* A. O. F. 1. No. 2. 30-32.

The poisonous properties of the "N'Daka" tree lie principally in the leaves, which are toxic when green but harmless when dried in the sun. After ingesting

the green leaves, an animal salivates and drinks profusely, locomotion becomes difficult and control of the limbs is lost. Violent colic ensues, accompanied by gaseous indigestion in the rumen; the pulse is feeble and the respiration accelerated, and the animal may die within 3-4 hours. P.M. examination reveals ecchymoses along the oesophagus, erosion of the rumenal wall with occasional perforations, congestion in the kidneys and liver, and ecchymoses in the endocardium. Native methods of treating these poison cases are described briefly, but no suggestion is made as to the nature of the toxic principles.—ALFRED EDEN.

RAYNOR, R. N. (1937). **The Chemical Control of St. Johnswort.**—*Bull. Calif. agric. Exp. Sta.* No. 615. pp. 38. 18 tables. [20 refs.]

The report deals with two years' work with herbicides on plots solidly infested with St-John's-wort. Sixteen different chemicals and six mixtures were employed. The mode of action, methods of application, effectiveness, cost, etc., of the more useful agents are discussed.

"Soil sterilization" by sodium chlorate, borax or both is indicated as the best method of control, and emphasis is laid on the necessity of applying the selected chemicals during definite seasons of the year, depending on the amount and distribution of rainfall.—F. J. ANDREWS.

## PHYSIOLOGY

BURR, H. S., HILL, R. T., & ALLEN, E. (1935). **Detection of Ovulation in the Intact Rabbit.**—*Proc. Soc. exp. Biol., N. Y.* **33**. 109-111. 1 fig. [2 refs.]

The authors have invented a method of determining the exact time of ovulation in rabbits by the use of a vacuum tube potentiometer which, with a pair of silver-silver chloride electrodes, is capable of registering small changes in voltage between the readings of electrodes in the vagina and on the abdominal wall, the assumption being that the act of ovulation causes electrical changes in the body.

This assumption was verified by applying the apparatus to female anaesthetized rabbits a few hours after mating. The time of ovulation was determined exactly by the fact that it is explosive in character and causes a change in potential of 7,000-20,000 microvolts, shown very clearly by the instrument.—J. E.

REBOUL, J., FRIEDGOOD, H. B., & DAVIS, J. (1937). **Electrical Detection of Ovulation.**—*Amer. J. Physiol.* **119**. 387.

The authors have confirmed the observation of BURR, HILL, and ALLEN [above] that ovulation in the rabbit is associated with a characteristic electrical change.—H. V. HUGHES.

MIESCHER, K., SCHOLZ, C., & TSCHOPP, E. (1938). **The Activation of Female Sex Hormones. 1. Oestrone and its Esters. The Output of Activity and Efficiency Coefficient.**—*Bio-chem. J.* **32**. 141-148. 4 figs., 2 tables. [16 refs.]

An investigation was carried out on the effect of "activators" such as palmitic acid and stearyl alcohol on the effect of oestrone in the oestrus test in the rat. In addition, the effects of one aromatic and eleven aliphatic esters of oestrone were tested by both the oestrus and the uterus growth tests.

In the oestrus test, castrated rats of 120 g. were used and the determined quantities of the substance administered subcutaneously in two equal doses on consecutive days. Each dose was dissolved in 0.5 ml. sesame oil. It was found that with free oestrone the average threshold value was 0.7γ. With the use of

so-called "activators" the activity of oestrone was increased, *e.g.*, the duration of oestrus with oestrone alone was five days, with oestrone plus 200 mg. palmitic acid, seven days, and with oestrone plus 200 mg. stearyl alcohol, 18 days.

Using the esters of oestrone, the threshold value was found to increase with the aliphatic esters according to the increase in the chain length of acid groups, at first slowly up to the valerate (0.85-1.5 $\gamma$ ) and then more quickly up to the palmitate and the stearate (up to 75.0 $\gamma$ ). With the lower esters up to the valerate, oestrus appeared as with oestrone after 3-4 days, with higher esters up to the laurate after 4-5 days, and with the palmitate and stearate only after 5-6 days.

It was shown that with oestrone and its lower esters (acetate and propionate) even in high doses (50.0 $\gamma$ ), the duration of oestrus amounts to not more than five days. With the higher esters, however, the duration is prolonged so that with *n*-hexanoate and *n*-octanoate in total doses of 50.0 $\gamma$  it lasts 14 days. The palmitate and stearate show no effect at all in doses of up to 50.0 $\gamma$  but in doses of 100.0 $\gamma$  the duration is about 30-40 days respectively. The benzoate lies approximately between the valerate and *n*-hexanoate in effect.

In the uterus growth test, administration was as in the oestrus test the total dose generally amounting to 50.0 $\gamma$  (2  $\times$  25.0 $\gamma$ ). The effect on the weight of the uterus of free oestrone in sesame oil subcutaneously is relatively transitory, lasting up to about five days, and not very intense, giving an increase of about 45 mg. in a 50 mg. uterus.

The acetate and propionate give a slight increase in duration and intensity and from the butyrate onwards the increase is more pronounced and is most marked with the *n*-octanoate (giving an increase of about 145 mg. and lasting about 26 days). In this test also the benzoate value lies between those of the valerate and the *n*-hexanoate. It was noted that the maximum value of oestrone and its esters is obtained always on the fourth day.

The authors conclude that a simple observation of the onset of oestrus gives a wrong impression of the relative values of the compounds. When the date of onset was related to the duration of oestrus it was found that the resulting curves closely approximated those obtained from the uterus growth test. By this method of evaluation the output of activity of oestrone amounts to 12.2, of oestrone benzoate to 114.4, and of *n*-octanoate to 185.4 cg.-days.—J. G. MURRAY.

HALL, Kathleen, & KORENCHESKY, V. (1938). **Changes in the Liver of Male Rats after Castration and Injections of Sexual Hormones.**—*Brit. med. J.* Feb. 26th. 488-441. 2 tables. [16 refs.]

In this investigation 51 normal rats and 180 male rats castrated before puberty were used. It was found that in normal uninjected animals the weight of the liver per unit body weight decreased with age. At the age of 70 days or more the weight of the liver of castrated rats was less than in normal ones. Histologically the only change visible was a slight decrease in the size of the lobules. Injections of androsterone, androstenediol, transdehydroandrosterone, testosterone, and testosterone propionate caused the return of the liver of most castrated rats towards or to normal weight and structure. Testosterone and testosterone propionate had no effect on the liver of normal rats.

The absence of pathological changes in the livers of the castrated rats both before and after administration of the above male sex hormones suggests that the latter have a stimulating action on the liver. The authors suggest that this might have a practical significance in therapy if these effects could be reproduced in man.

Oestrone and oestradiol caused decrease in weight of liver of castrated rats. There were no pathological changes.—J. G. MURRAY.

- I. DODDS, E. C., LAWSON, W., & NOBLE, R. L. (1938). **Biological Effects of the Synthetic Oestrogenic Substance 4 : 4' Dihydroxy- $\alpha$  :  $\beta$ -Diethylstilbene.**—*Lancet*. 234. 1889-1891. 2 figs. [2 refs.]
- II. FOLLEY, S. J., & WATSON, Helen. (1938). **Some Biological Properties of Diethylstilboestrol.**—*Ibid*. 235. 423-424. 2 figs., 1 table. [10 refs.]

I. The substance had an action similar to that of oestrone on the uterus of ovariectomized rats, on the mating reaction, vagina and uterus of immature rats, on the uterus of immature rabbits, and on the feathers of capons. By vaginal smear assay on ovariectomized rats, it was about  $2\frac{1}{2}$  times as active as oestrone. It produced nipple growth in the g. pig.

II. It was found that diethylstilboestrol (1) partially inhibited the response of the pigeon crop-gland to prolactin; (2) inhibited lactation in the rat, and (3) produced a temporary increase in the phosphatase content of cows' milk, accompanied by more prolonged increases in both the fat and non-fatty solids content. The latter effect was in part due to an increase in the lactose content, which suggests that the treatment does not induce a change from normal milk to a colostral type of secretion. In all these respects the action of a diethylstilboestrol qualitatively resembled that of natural oestrogens.—J. M. ROBSON.

PINTEAUX, M. (1938). Rapports de la vitamine E avec les hormones sexuelles.—[**Relation of Vitamin E to Sex Hormones**].—*Rec. Méd. vét.* 114. 469-475.

Certain workers have claimed that wheat germ oil possesses properties which produce a cycle of changes in the sexual apparatus similar to that produced when anterior pituitary hormone is injected into immature female animals. It would appear fairly clear that vitamin E has no direct oestrogenic action. P. suggests that its alleged effect must, therefore, be due to increased production of anterior pituitary hormone arising as a result of wheat germ oil administration. P's observations on various species support the more widely held view that vitamin E has no gonadotropic properties, and that vitamin E, therefore, cannot be substituted for anterior pituitary hormone in cases of sexual abnormality due to dysfunction of the anterior pituitary gland.—N. J. SCORGIE.

KUSTALLOW. (1937). Reaktion zur Bestimmung normaler und ektopischer Schwangerschaft mittels Infusorientierchen. [**A Pregnancy Test Using Infusoria**].—*Zbl. Gynäk.* 5. 569-573.

K. found that living paramacia in a hay infusion were killed within five minutes if pregnancy urine was added, and that they survived for much longer than five minutes with non-pregnancy urine. In practice, one drop each of hay infusion and urine are placed on a slide and examined microscopically. Reliable diagnostic results are claimed.—J. E.

GETTKANDT, A. (1937). Trächtigkeitsnachweis beim Rind durch Einwirkung von Harn auf Paramäcien. (Kustallowsche Reaktion). [**Application of Kustallow's Test for Pregnancy in Cattle**].—*Dtsch. tierärztl. Wschr.* 45. 783-785. 3 tables. [4 refs.]

G. carried out this test [see above] on 71 slaughter cattle, and states that his diagnosis was correct in 94% of cases.—M. F. BENJAMIN.

NICOLAU, S., & KOPCOWSKA, L. (1938). "Inclusions" cellulaires acidophiles dans le tissu nerveux et dans le rein des pigeons "normaux". [**Acidophilic Cellular Inclusions in the Nerve Tissue and Kidney of Normal Pigeons**].—*Ann. Inst. Pasteur.* 60. 808-815. 7 figs. [5 refs.]

Inclusion bodies having a resemblance to Negri bodies or Joest-Degen cor-

puscles, were found in the kidneys and brains of "normal" pigeons. They were sometimes accompanied by mononuclear perivascular infiltrations in the spinal ganglia and in the nerve tracts. The authors postulate that these bodies represent the reaction of an unidentified virus which induces an inapparent form of disease. [A similar theory was advanced with regard to inclusion bodies found in "normal" dogs—*V. B.* 7. 178].—R. E. GLOVER.

BOND, C. J. (1938). **On Certain Phases in the Life History of the Polymorph Leucocyte. The Influence of Cell Activity on the Number and Arrangement of the Nuclear Lobes.**—*Brit. med. J.* Aug. 6th. 281-282. 3 charts. [8 refs.]

B. propounds the view that the number of nuclear lobes in the polymorphonuclear leucocyte is related to the activity of the cell, rather than to the age of cell as has been generally accepted. By comparing the total number of nuclear lobes in 100 cells in the same individual's blood, taken at the same time, (a) in the normal blood film, (b) in the same blood after incubation, and (c) in the same polymorphonuclear leucocytes incubated after standing at room temperature for six hours, he was able to demonstrate an increase in the total number of nuclear lobes.

—D. L. HUGHES.

HAMBURGER, C. (1938). **How Early Can Anti-Gonadotropic Hormone be Demonstrated? (Experiments with Rabbits Treated with Mare Serum Hormone).**—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 224-235. 4 figs., 2 tables. [4 refs.] [In English].

H. found that the weight of the ovaries of rabbits treated with 100 mouse units of mare serum hormone per day increased up to one hundred-fold or more during the first 18 days of treatment, but subsequently decreased, in spite of treatment continued beyond this time. In investigating the causes for this regression in weight, it was found that anti-gonadotropic hormone against mare serum hormone appeared as early as the ninth or tenth day of treatment, and that in 19-32 days sufficient was present in 1 c.c. of the rabbit's serum to inhibit 25 mouse units of mare serum hormone.—N. J. SCORGIE.

BAYER, G., & WENSE, T. (1937). **Zur Frage Nebenniere und Infektion. [The Adrenal Glands and Infection].**—*Wien. klin. Wschr.* 50. 682-688. [Numerous refs.]

A short survey of the literature showing the importance of the adrenal glands in resistance to infection and in maintaining the level of the body salt in acute infections. Loss of the adrenals quickly led to loss of the body salt, but this process can be reversed by dosing with adrenal extract. Fever results in the loss of salt, which loss is resisted by the adrenals. The authors suggest that the administration of salt and adrenal extract may be valuable in the treatment of infections.

—J. E.

NEGRI, R. (1938). **Ormoni sessuali e diagnosi di gravidanza nella cavalla. [Hormonal Diagnosis of Pregnancy in Mares].**—*Profilassi.* 11. 107-110.

N. gives a short description of the functions of the various sex hormones and of the technique of the so-called pregnancy tests. Non-pregnant mares excrete 600-8,200 mouse units of oestrone in their urine; the amount rises slightly during oestrus and steadily increases during pregnancy to a maximum of 888,000 M.U. This point is reached about the 248th day of gestation. All the biological methods, particularly Friedman's test, appear excellent for the diagnosis of pregnancy in

mares and asses. Serum as well as urine must, of course, be provided. Cuboni's test is very reliable after the fourth month of pregnancy. It is impossible to diagnose pregnancy in cows at an early stage by any of the tests at present in use. [No new material is given].—J. A. NICHOLSON.

## TECHNIQUE AND APPARATUS

FOLEY, H. (1938). Techniques de prélèvements de laboratoire et de récolte de matériaux de parasitologie et d'histoire naturelle. [**Laboratory Equipment and the Collection of Biological Specimens**].—*Arch. Inst. Pasteur Algér.* **16**. 54-104. 18 figs., 3 plates. [14 refs.]

F. enumerates precautions necessary for the care of the microscope in the tropics, with a list of essentials for adequate microscopic technique as well as for the preparation of slides and stains. After directions regarding the labelling and dispatch of samples, details are given concerning the collection of blood samples in man, large and small mammals, birds and cold-blooded animals. There follows the preparation and staining of thick and thin blood films, with packing methods and postal regulations. Laboratory technique is described for leucocyte counts, sternal puncture for sampling bone-marrow, samples of sputum, pus, conjunctival secretion and faeces (for the presence of cysts, eggs, etc.). Specimens from ring-worm and tumours are next considered. Details are given concerning the collection of zoological and botanical specimens.—R. O. MUIR.

ELLIOTT, S. D. (1938). **The Use of Saponin in Blood Culture Media, with Special Reference to Blood Cultures in Subacute Bacterial Endocarditis**.—*J. Path. Bact.* **46**. 121-131. 9 tables. [2 refs.]

In blood culture work with cases of slight infection, it may happen that leucocytes in the drawn blood phagocytose the few bacteria present and so give rise to a negative result. To overcome this, E. introduced saponin into blood culture samples and found that in a concentration of 0.033% in a citrate blood-broth mixture containing 16% of blood and 0.17% of sodium citrate it caused lysis of both red and white blood corpuscles, with a consequent rise in the number of positive culture tests for streptococci.—J. E.

MÜLLER, A. (1937). Einfache Anaerobenzüchtung in Kulturschalen und Reagenzglasern. [**Single Anaerobic Culture in Plates and Test-Tubes**].—*Zlb. Bakt. I. (Orig.)*. **140**. 66-69. 2 figs. [1 ref.]

A thick disk of a mixture of kieselguhr, gypsum and pyrogallol is secured by heat to the lid of a Petri dish, which is then placed over the other half of the dish, which was previously sown. 2 c.c. of 80%  $K_2CO_3$  solution is spread over the kieselguhr plate before use. The lid is then cemented on to a glass plate to make the culture airtight. In the case of test-tubes, plugs prepared in the same way are used and the opening is sealed.—M. F. BENJAMIN.

WEINECK, E. (1938). Ueber das Verhalten des filtrierbaren Virus (Hühnerpest, Maul- und Klauenseuche) im Gewebe von Hühnembryonen. [**Behaviour of Fowl Plague and Foot and Mouth Disease Viruses on Fowl Embryo Tissue Culture**].—*Zlb. Bakt. I. (Orig.)*. **141**. 14-21. 2 figs. [15 refs.]

Cell-free filtrates of infected brain did not infect the egg embryos, but this was done by unfiltered brain. The virus was passaged through eggs up to 42 times and retained its virulence throughout. It had a damaging effect on the

vessels of the allantois, resulting in the death of the embryos. On histological examination the ectoderm and mesoderm of the allantois were found to be thickened and invaded by erythroblasts, but the endoderm was unchanged. The vessels of the allantois were filled with normoblasts and surrounded by cell debris, and the endothelial cells were swollen and destroyed. Similar experiments with F. & M. disease virus were negative; there was no infection of the embryo and no increase in the virus. The technique adopted was similar to that of BURNET [see also *V. B.* 7. 525.], which was as follows:—

"The first stage in inoculating the egg is to cut through the shell [with] a dental engine fitted with a thin cutting disc. . . . In cutting the shell, care must be taken to avoid damaging the underlying shell membrane. . . . After making the triangular cuts two small intersecting cuts just sufficiently deep to penetrate the hard surface of the shell are made in the centre of the area corresponding to the air space. . . .

For the actual inoculation, a small hole is first drilled into the air space with the egg piercer, a short length of steel rod about 2.5 mm. in diameter with a four-sided point. The triangle of shell is removed with a straight cutting-edged needle mounted on a suitable handle. A slit is now made in the shell membrane running in the direction of its fibres, i.e., obliquely transverse. This procedure is the only part of the technique which can be regarded as of some difficulty. The chorioallantois lies immediately beneath the shell membrane, and is easily pierced by the needle point. . . . Properly done, this should result in the production of a little wedge of air between the lifted edge of the shell membrane and the chorioallantois. If this is present, slight suction with a rubber teat on the opening into the air space will result in the egg contents being displaced into the air space with the development of an artificial air space between the shell membrane and the chorioallantois. . . .

Once the chorioallantois has fallen away, the slit can be enlarged as desired. If a measured amount of inoculum is to be used, an opening large enough to allow free entry of a capillary pipette without touching the sides should be made. About 0.05 c.c. of the material to be inoculated is taken up in a sterile Pasteur pipette and blown gently on to the chorioallantois. The egg is then labelled with pencil, and the openings sealed. A rim of paraffin-vaseline mixture is built up round the triangle from a Pasteur pipette filled with the heated material, and a warm coverslip placed over the opening".—SASSENHOF (MUNICH).

GOODPASTURE, E. W. (1938). **Some Uses of the Chick Embryo for the Study of Infection and Immunity.**—*Amer. J. Hyg.* 28. 111-129. [Numerous refs.] [See also *V. B.* 7. 525].

The technical researches which have led up to the use of chick embryos for the study of infectious diseases are discussed, and the modern technique of inoculating eggs is outlined.

In discussing the objects and uses of egg embryos it is stressed that many of the viruses which infect man and animals have been cultivated in this way, the rickettsia of Rocky Mountain spotted fever has been successfully grown, and likewise a number of pathogenic bacteria including *Haemophilus influenzae* and *H. pertussis* (causal organism of whooping cough).

Among the advantages which egg embryos offer over other laboratory methods of study is the fact that a fertile egg is no more expensive than a test tube of medium. Moreover, the technique of inoculation is by no means difficult, and is one which is easily acquired by practice. The growth which occurs in the egg, having taken place in the presence of living tissue, approximates closely to the type of growth occurring under natural conditions of infection. Furthermore, the cellular reaction of living tissue to this growth can also be studied, particularly if care is taken to inoculate the organisms into that layer which constitutes the optimum growth medium.—E. J. PULLINGER.

HIMMELWEIT, F. (1937). **Fluorescence Microscopy on Living Virus with Oblique Incident Illumination.**—*Lancet.* 233. 444-445. [Copied *verbatim* from *Bull. Hyg., Lond.* 12. 909. Signed G. S. WILSON].

In fluorescence microscopy two methods of illuminating the object are avail-

able. The first is by means of a suitable substage condenser; the second is by oblique incident illumination. In the second method, which is described here, an arc, a Leitz-Ultropak outfit, and a collecting lens made of crown glass were used, which with suitable filters provided a beam of ultra-violet light ranging from about 3,500 to 4,000 A.u. The chorio-allantoic membrane of developing chicks, infected with a suitable virus, was examined. The membrane was brought into immersion contact with the underside of a cover slip without altering its normal structure. To obtain differentiation the membrane was treated with primuline or with Titan yellow 2 GS, which fluoresced brilliantly. Examination of egg membranes infected with ectromelia virus revealed the inclusion bodies as mauve structures within pale blue cells against a violet background of normal tissue. With the highest N.A. objectives elementary bodies could be distinguished in the inclusion bodies as bright blue particles on a mauve background, which represented the matrix. In vaccinia-infected membranes light blue elementary bodies could be made out vibrating actively against a mauve background.

ECKER, E. E., & PILLEMER, I. (1938). **An Inexpensive Method for the Dehydration and Preservation of Complement and Other Biological Materials.**—*Amer. J. publ. Hlth.* **28**. 1231-1232. [9 refs.]

The apparatus consists of a high vacuum pump connected to a one gallon size aspirator bottle which serves as a trap, and an ordinary vacuum desiccator. The desiccant used is barium oxide, 80 g. being sufficient to dry 1 c.c. of fresh serum. The sera are frozen in a dry-ice bath with alcohol, acetone or kerosene, the vials are dried and placed in the desiccator and the pump is started at full capacity. The period of drying varies from 12 to 18 hours, depending on the quantity of materials used. When the operation is completed the vacuum is released slowly and the vials are immediately stoppered with rubber stoppers.—R. ALLCROFT.

ASHESHOV, I. N. (1938). **A Simple Method for the Sterile Filtration of Small Amounts of Fluid.**—*J. Bact.* **36**. 197-199. 1 fig. [2 refs.]

A miniature candle of the Chamberland series is fitted to the tapered end of a 10 or 20 c.c. transfer pipette by means of thin rubber tubing, and the connexion sealed with a watery emulsion of latex to prevent leakage. After shortening of the upper end of the pipette to about 3 in., the mounted candle is placed in a long test tube and sterilized in the autoclave. When required for use the candle is immersed in the fluid to be filtered and suction applied to the end of the pipette by a vacuum pump or a compressed rubber bulb. When sufficient filtrate has appeared in the bulb of the pipette it is disconnected and the filtrate withdrawn with a Pasteur pipette. About 10 c.c. of sterile filtrate can be obtained in five minutes.—R. ALLCROFT.

LINS, A. E. E. (1936). Ovohelminthoscopies. [Search for Worm Ova in Faeces.]—*Boletim da Secretaria Geral de Saude e Assistencia.* **2**. 83-93. 8 figs. on 5 plates. [English summary]. [Copied *verbatim* from *Trop. Dis. Bull.* **35**. 216. Signed H. H. S.]

The author employing the technique described below states that he obtained much better results from direct examination than by ordinary methods [he does not compare his with the more highly concentrating methods of Clayton LANE, and others].

He employs an "enrichment fluid" composed of acetic acid 5 c.c., formol 10 c.c., hydrochloric acid 75 c.c. and distilled water 110 c.c. and the steps of the procedure are as follows:

One c.c. of the enrichment fluid is placed in a conical glass with an equal amount of faeces and the two mixed with a glass rod to a uniform suspension, after which the reagent is added slowly to 20 c.c. and after rapid stirring with a glass rod is transferred to a centrifuge tube and spun for two minutes: the supernatant fluid is decanted and the deposit spread with a pipette on a slide and examined.

Among the advantages claimed for this method are that the morphology of eggs and larvae is not altered, that the specimen keeps well for demonstration purposes, and gives a higher percentage of positive findings, 40 per cent., as compared with an average of 12 per cent.

ARTIGAS, P. DE T. (1936). **Mounting of Helminths and Small Arthropods. A New, Simple and Efficient Method.**—*Mem. Inst. Butantan.* 10. 71-75. 10 figs. on 4 plates. [Portuguese version pp. 65-70]. [Copied *verbatim* from *Trop. Dis. Bull.* 35. 216-217. Signed C. LANE].

"In this paper a new method is described for toto-mounting nematodes. This new method can also be used with plathelminths and small arthropods.

"The mounting medium is obtained by dissolving mastic resin (from *Pistacia lentiscus*) in creosote [beechwood creosote].

"This mastic-creosote fluid is prepared as follows:

"30 c.c. of 95 per cent. alcohol are added to 10 gm. of pulverized mastic. The mixture is left in an incubator at 55°C., for 24 hours. Then, the alcoholic mastic is taken off and, after cooling centrifuged. The sediment is then poured off by decantation and, if necessary, the fluid is centrifuged once more.

"30 c.c. of pure creosote are added to the alcoholic mastic and the whole mixture is placed in the incubator at 55° until complete evaporation of the alcohol. The resulting fluid, which is clear and sirupy, after solidification takes a yellowish coloration.

"A very simple mounting technic has thus been adopted:

"1. Treatment with acetic acid. The length of time required varies according to the thickness and size of the nematode and is completed with its clearing.

"2. Treatment with creosote. In this substance remains the nematode until fully impregnated. There is no harm to the specimen in prolonging this step for some hours.

"3. Mounting between slide and cover-slip in mastic-creosote fluid.

"4. Hardening of the mounting medium in the incubator at 50°C.-55°C.

"In order to obtain coloured preparations, the material must be treated with hydrochloride carmine or Semichon's acetic carmine (prepared according to Langeron's indications). The staining precedes the other steps of the mounting technic. Overstaining differentiation is done by means of hydrochloric water or hydrochloric alcohol."

[Presumably glacial acetic acid is intended.]

## MISCELLANEOUS

GREAT BRITAIN. (1938). **Report of the Committee on Veterinary Education.** pp. 124. 10 appendixes. London: H. M. Stat. Off. [8vo].

The Committee was first appointed on the 3rd November, 1936, and its function was defined as:—

"To review the facilities available for veterinary education in Great Britain in relation to the probable future demand for qualified veterinary surgeons and to report thereon, and

in particular to make recommendations as to the provision which should be made from public funds in the five years 1937-42 in aid of the maintenance expenses of institutions providing veterinary education."

The committee conducted an extensive enquiry and published the following conclusions and recommendations :-

"1. A well-trained veterinary profession is an important factor in national wealth, security and health. The annual loss from diseases in farm-livestock in the United Kingdom is established at about £19,000,000 (paras. 1-6).

2. The State has not contributed liberally to the training of the profession. Veterinary education has been starved. The Veterinary Schools are overcrowded; teaching staffs are inadequate and in some instances poorly paid; facilities for clinical and practical training are insufficient. If defects are to be made good, considerable expenditure must be faced. The system of education and courses of study also need amendment (paras. 7-10).

3. The annual demand for newly qualified veterinarians is estimated at about 150 during the quinquennium (1937-8 to 1941-2) and thereafter at about 115. The growth of demand has, however, exceeded expectations in the past and may do so again (paras. 16-18).

4. There are at present four teaching Schools in Great Britain—at London, Edinburgh, Glasgow and Liverpool. The University of Cambridge is also preparing to participate in veterinary education (para. 20).

5. The four Schools, and a School in Dublin, are affiliated to the Royal College of Veterinary Surgeons. The College does not teach, but examines, gives the licence to practise and is a disciplinary body. While it has no direct control over the Schools it exercises indirect control through its examinations. The Schools have no right of representation on the Council or Examination Committee of the R.C.V.S. (paras. 21 and 22).

6. The relationship of the Schools to Universities varies. The London School is loosely connected with London University as an institution having recognised teachers. The Edinburgh School is affiliated to Edinburgh University and the connection between the two is fairly close. The Liverpool School is a Department of Liverpool University. At these three Schools an increasing proportion of the students reads for Degrees as well as for the Diploma of the R.C.V.S., but the additional cost of tuition and examination fees is onerous. The Glasgow School has University representatives on its Governing Body, but no other connection with the University. At Cambridge it is proposed that students shall graduate with Honours and then proceed for two years to one of the Veterinary Schools (para. 22).

7. The whole lay-out of veterinary education is disjointed and unsystematic. A more organic connection is needed between the Schools, the Universities and the R.C.V.S. (paras. 23-25).

8. Veterinary education should be brought into closer connection with Universities. Students should have an opportunity of taking a Degree in science on their way to the professional qualification without loss of time or heavy additional fees. The Universities at Edinburgh, Glasgow, London and Liverpool are invited to consider the institution of a Degree obtainable by veterinary students in the first three years of their course after study of the subjects as given in our amended curriculum for the corresponding M.R.C.V.S. examinations. Success in the Degree examinations should exempt from the corresponding examinations of the R.C.V.S. (paras. 26 and 27. See also Chapter VIII).

9. The R.C.V.S. should be given power to include on its Council and Examination Committee representatives of the affiliated Veterinary Schools and of the five Universities of Cambridge, Glasgow, Edinburgh, London and Liverpool; to send observers to examinations which exempt from its own examinations; to inspect facilities for training in animal husbandry and clinical subjects; to require from candidates for membership periods of residence on farms and with veterinary practitioners; and to appoint as full examiners for its examinations Members of the Council and teachers in the affiliated Schools (para. 29).

10. The Act or Charter reconstituting the Council of the R.C.V.S. should provide that no further University in the United Kingdom shall be represented on the Council; aid from public funds should not be made available for veterinary teaching by any further Universities (para. 29).

11. The R.C.V.S., the Universities and the Veterinary Schools should consult together at an early date with a view to the elaboration of a scheme for carrying into effect such of these recommendations as require agreement and joint action; and the Government should initiate such legislation as may be necessary to give effect to these recommendations (para. 29).

12. The above recommendations provide a solution to most of the difficulties associated with the present one-portal system of entry into the profession, and one well suited to present conditions (para. 30).

13. A sufficiency of senior posts, preferably Chairs, should be created to encourage the several branches of veterinary science (para. 28).

14. The veterinary curriculum should be reorganised so as to secure such an arrangement of the subjects that the student is taken from one to another in logical sequence and that the first three years are devoted to a combination of scientific studies on which Universities may award degrees. The proposed curriculum is set out in detail with corresponding examinations (paras. 41-46).

15. The veterinary surgeon of the future will be more and more concerned with the maintenance of stock in health and not purely with their restoration to health. A pupillage of at least six months on a farm at varying seasons of the year should be required as a foundation of a more practical training in animal husbandry. For this training itself a Field Station of about 100 acres, at which the different kinds of livestock are kept, should be attached to each School. More attention should also be given to clinical study of farm livestock, and for this purpose a sufficient supply of clinical material must be available; the lack of such material is at present a serious defect in training. Each School should possess an adequately equipped and staffed hospital for large animals, and such a hospital is best situated in the country adjoining the Field Station. The co-operation of practitioners should be sought in securing the needed supply of sick animals. In addition, a period of at least six months with a veterinary practitioner should be made compulsory for each student (paras. 31-40).

16. The situation of none of the Schools is ideal. The Schools in Camden Town, Liverpool and Edinburgh (which are at present grant-aided) must, however, remain where they are. To maintain the required output of qualified persons a fourth School is necessary because these three Schools cannot efficiently accommodate the number of students required to produce this output, and cannot be expanded, at Liverpool on account of local conditions, in London and Edinburgh without exceeding the proper maximum size of a Veterinary School dictated by the requirements of clinical instruction. The best location for a fourth School is at Glasgow, and a complete reorganisation and rebuilding of the Glasgow School is recommended (see Chapter XV). All four Schools together with a proposed scheme of pre-clinical veterinary studies at Cambridge University should be reorganised for aid from the Exchequer (paras. 48-54).

17. The maximum number of students at the Schools should be reduced by the end of the quinquennium to the following: Camden Town 250, Liverpool 125, Edinburgh 225, and Glasgow 200, post-diploma students and Cambridge graduates coming for clinical training to be supernumerary to these quotas. Should future demand require it, some possible expansions in these numbers are indicated to provide for an additional 100 students in all (paras. 52 and 53).

18. The quality of the teaching in the Schools is in many ways most unsatisfactory; this is mainly due to understaffing. The scales of salary are in some cases too low in comparison with those of the State Veterinary Service and of other veterinary posts (para. 55).

19. *Royal Veterinary College and Hospital.*—A Field Station in the country, including a hospital for large animals, is necessary; the capital cost is estimated at approximately £42,000 and a Government grant is recommended towards this cost. Schemes of staffing and salary scales are recommended; a block grant of £25,000 per annum is required in respect of the maintenance of the School during the quinquennium; and an additional maintenance grant will be needed on the establishment of the Field Station and hospital for large animals (paras. 56-62).

20. *School of Veterinary Science, Liverpool University.*—This School should be developed as a School with special facilities for training in the treatment primarily of cattle and secondarily of other farm animals and poultry. The capital cost of the Field Station and hospitals for large animals which are necessary is estimated at £38,000. The present veterinary buildings in Liverpool should be demolished and a new building erected on the present site, with extensions: the cost of the rebuilding scheme is estimated at £100,000. A Government grant is recommended towards the capital cost of the Field Station and the rebuilding of the main block of the School in Liverpool. Schemes of staffing and salary scales are recommended; a block grant of £8,000 per annum is required during the quinquennium and this will need to be increased when the Field Station is established and the School is rebuilt (paras. 63-80).

21. *Cambridge University.*—A scheme of pre-clinical and post-clinical training at this University is recommended for Government aid. The capital cost of the scheme is estimated at £10,100 but might in certain eventualities be £16,600, towards which the University can find £4,500; a Government grant in respect of the balance of the cost is recommended. As regards maintenance costs, deficiency grants assessed departmentally are recommended up to a maximum of £900 per annum in respect of the undergraduate course and up to a maximum of £550 per annum for the Diploma course (paras. 81-88).

22. *The Royal (Dick) Veterinary College, Edinburgh.*—Recommendations are made regarding an extension of the Clinical Department of the School and other improvements

of a capital nature. These will involve an increase of £36,000 in the capital cost of a building scheme previously estimated at £40,000, for which a grant on the £ for £ basis up to £20,000 from the Development Fund has been offered. A Government grant in respect of this increased cost is recommended. It is hoped that in due course a Field Station will be provided as recommended for other Schools, and any application of the School for this purpose should receive sympathetic consideration. Schemes of staffing and salary scales are also recommended. A block grant rising to £14,000 per annum during the last three years of the quinquennium is required (paras. 89-95).

23. *The Glasgow Veterinary College (Incorporated).*—A complete reorganisation and rehousing of this School are recommended, the University of Glasgow becoming responsible for the first three years of studies, whilst the subjects of the fourth and fifth years would be taught under the direction of the Governors of the existing College in new buildings on the outskirts of the City. A joint Board of Veterinary Studies is suggested. On condition that such a reorganisation is effected, a resumption of State assistance is recommended as from 1940-1. The capital costs of reconstruction are estimated at £40,000 for the additional buildings required at the University for the teaching of anatomy, physiology and pathology, and £39,400 for a Field Station and hospital for large animals on the outskirts of the City for the teaching of animal husbandry and clinical subjects. Grant is recommended in aid of this capital scheme. A recurrent grant of the order of £12,900 per annum in the years 1940-1 and 1941-2 is recommended for maintenance (paras. 96-101).

24. In all, a capital expenditure of £299,000 and recurring grants rising to £61,350 are involved in the above recommendations and some further small grants will be necessary when the Field Stations at London and Liverpool are ready for occupation. The various improvements in veterinary education which are recommended form parts of a balanced plan, the full benefit of which will be lost if the building programme is not carried out. The £ for £ principle for capital grants from the Government should not be insisted on. It should, however, be possible to raise locally part of the cost of the out-station at Glasgow. If effect is given to the proposals the cost to the State of veterinary education will be less per student than in some continental countries and the outlay would be well justified (para. 102).

25. The value of advanced post-diploma courses, particularly the F.R.C.V.S., is emphasised. The D.V.S.M. has a useful place in the scheme of veterinary education and its disappearance would be unfortunate (para. 103).

26. Refresher courses for veterinary practitioners are necessary in view of the rapid advances in scientific knowledge. They should be given at Veterinary Schools and should cover a few subjects only at a time (para. 105).

27. A scheme for special courses of instruction in poultry disease control and poultry husbandry to be given jointly at Liverpool University and Harper Adams Agricultural College is approved; and grants are recommended of £300 to cover the expenditure on initial equipment, and not exceeding £750 per annum towards the net maintenance expenditure. It is also desirable that shorter intensive courses should be provided for busy veterinary practitioners who are unable to undertake a course of the length of the above joint course (paras. 106-108).

28. The veterinary student is more likely to be successful if he comes from the farm or is the son of a practising veterinary surgeon than if he is town bred (paras. 11-15). In the admission of students preference should be given by the Schools *ceteris paribus* to students who come from farms or are the sons of practitioners; in selecting town-bred students, preference should be given *ceteris paribus* to those who have acquired experience on farms before applying for entry (para. 109). The number of women students admitted by the Schools should be small (para. 110).

29. Fees for the M.R.C.V.S. course should be not less than £40 per annum in the English and £35 per annum in the Scottish Schools. Students should make their own arrangements for payment of fees to private practitioners and farmers (para. 111).

30. Teachers in the Schools should have time for research. Such research should be of a fundamental and disinterested nature undertaken for the advancement of basic knowledge. Training of research workers is a post-diploma matter; existing schemes of post-graduate research scholarships are commended (paras. 112 and 113).

31. The Schools should not relax their efforts to secure additional income from other than State sources; some possible sources of income are indicated (para. 114).

32. A special enquiry on unqualified practitioners should be instituted by the Government (paras. 115-118)."

[An extensive commentary on this report has appeared in the *Veterinary Record*, beginning on October 1st, 1938, and ending on December 31st, 1938].

LORD HAILEY. (1938). **An African Survey. A Study of Problems Arising in Africa South of the Sahara.** pp. xxviii + 1887. 17 tables, 6 maps. London : Oxford University Press. [8vo].

This monumental work was produced as a result of the labours of the African Research Survey Committee since 1933.

It was found necessary to place some limitation on the extent of the work involved. Consequently it was decided in the first place to confine the survey to that part of Africa which may be roughly described as lying south of the Sahara.

The book is divided into twenty chapters each dealing with special subjects ; the chapters on the Physical Background, the African Peoples, the State of the Land, Agriculture, Forests, the Problem of Water Supply, Soil Erosion, Health, Economic Development, and Transport and Communications are of special interest to readers of this *Bulletin*. In the final chapter, covering 27 pages, conclusions are given *seriatim* of the matter dealt with in the earlier chapters on special subjects. There is an excellent index.

All interested in African conditions should possess this book.

WORTHINGTON, E. B. (1938). **Science in Africa. A Review of Scientific Research Relating to Tropical and Southern Africa.** pp. xiii + 746. 8 plates, 5 maps. London : Oxford University Press. [8vo].

This book is complementary to Lord Hailey's survey, and deals with scientific work carried out in Africa.

The work is dealt with in eighteen chapters, of which those on Some Problems of Research, Soil Science, Botany, Forestry, Zoology, Entomology, Agriculture, Animal Industry, Health and Medicine, Human Disease, and Health and Population are of special interest to our readers.

Animal diseases are dealt with chiefly in the chapters on Entomology and Animal Industry. There are valuable bibliographies to most of the subjects discussed, and there is a good index. This book should be in the possession of all interested in African conditions.

ANON. (1938). **Tabulation of Post-Mortem Results.**—*Brit. med. j.* April 2nd. 740-741.

The system of tabulating the results of autopsies at the Adelaide hospital is referred to, and its potential importance in linking up diseases by records of lesions associated with them is emphasized.

A summary of the results of each autopsy is written out and indexed under appropriate headings on cards, which are arranged in groups and published on the completion of every thousandth autopsy. In this way the full P.M. findings of each case affected with any particular organic disease may quickly be seen, and much can be learnt from a study of the records.—J. E.

— (1938). L'istituto zooprofilattico sperimentale di Brescia. [**The Animal Disease Institute at Brescia**].—*Azione vet.* 7. 262-264. 3 figs.

Founded in 1922, and much cramped in its first years, the Institute later gained local support and has expanded considerably. Diagnostic examinations carried out increased from 276 in 1922 to 3,857 in 1936 and in that year curative symptomatic treatment for foot and mouth disease was given by the institute staff to 20,000 swine, to 5,040 bovines and to 2,500 cattle.

Sera and vaccines are prepared, and some 1,500 carcasses are examined bacteriologically each year, about 10% being condemned [? abattoir inspection ;

no details given]. Good results are claimed in the sphere of bovine sterility, and a special training course on this subject is given to veterinarians. Virus and serum against swine fever were produced, and since 1934 the Institute has been the source of supply for all Italy, results being very satisfactory.

AGRICULTURAL RESEARCH COUNCIL. (1938). **Dairy Research**. pp. 101. 5 tables, 1 map, 2 appendixes. [12 refs.] London: H.M. Stat. Off. [8vo] [2s.]

This publication is a review of some of the most important aspects of dairy research, compiled by the Agricultural Research Council as a result of visits to centres and interviews with various workers. The chief research centres visited were:—The National Institute for Research in Dairying, Reading, The Hannah Dairy Research Institute, Ayr, the West of Scotland College of Agriculture, the East of Scotland College of Agriculture, the University of Manchester, and the laboratories of United Dairies Ltd.

The work already done at each centre is noted, together with programmes that will be undertaken. A wide field is covered by the institutes, including such subjects as tuberculosis, mastitis, contagious abortion, pasteurization, bacterial content of milk, the protein requirements of cows, grass drying, and the purification of milk factory effluents.—H. E. BYWATER.

COTTIER, H. (1937). *L'élevage en Tunisie*. [**Animal Husbandry in Tunisia**]. pp. 10. 5 figs., 1 table, 1 graph, 1 map. [6 refs.] Paris: Institut de l'encyclopédie coloniale et maritime. [fcp].

The general conditions of animal husbandry in Tunisia are reviewed, and a census of the livestock population is given. A brief reference is made to the work of the Institut Arloing, the veterinary laboratory for Tunis.—N. J. SCORGIE.

KON, S. K. (1938). **Biennial Reviews of the Progress of Dairy Science. Section D. The Nutritional Value of Milk and Milk Products.**—*J. Dairy Res.* 9. 242-262. [Numerous refs.]

These reviews should be read in the original. The section is divided into:—(1) nutritional value of milk as estimated in laboratory and field experiments, and (2) nutritional value for human beings. Under the second heading heated milk and irradiated and vitaminized milk are dealt with.

ANON. (1938). **Explosions in the Operating Theatre.**—*Lancet*. 234. 561. [2 refs.]

An editorial on the danger of using potentially explosive mixtures (oxygen, ether, etc.) for general anaesthesia. Explosive mixtures can be ignited by static electricity produced in metal furniture, etc., such as is used in operating theatres; this can be guarded against by earthing the table if the floor is an electrical conductor and by maintaining a humid atmosphere (<65% saturation) in the room.  
—J. E.

## OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1938). **Report of the First Imperial Veterinary Conference. 15th-18th August, 1938.** pp. 97. 2 tables, 3 appendixes. Weybridge: Imperial Bureau of Animal Health. [4to] [5s.]

The first Imperial Veterinary Conference was held at the Royal Veterinary College, London on August 15th-18th, 1938, and the report has just been issued. It was attended by delegates from the United Kingdom, from each of the

Dominions, and from territories under the Colonial Office. The Conference was opened by Mr F. L. McDOUGALL, a member of the Executive Council of the Imperial Agricultural Bureaux, who pointed out the economic importance of the livestock industry in the territories of the British Empire and the results that have been achieved in the control of animal disease.

At the meeting on the Imperial Bureau of Animal Health, a report was read by the Deputy Director on the work done since the Bureau was opened in 1929. A complete review of current veterinary literature is produced by the Bureau through the agency of *Index Veterinarius* and the *Veterinary Bulletin*. The committee which reported on the work of the Bureau expressed its approval of the work done, and emphasized the extreme importance of the Bureau to all those engaged in veterinary research in the countries of the British Commonwealth of Nations.

The discussion on FOOT AND MOUTH DISEASE was opened by Mr D. A. E. CABOT, Chief Veterinary Officer, Ministry of Agriculture and Fisheries, Great Britain, who gave an account of the means by which cattle become infected in Great Britain. Resolutions were passed recommending that research should be continued, and that countries in which the disease was not endemic should enforce precautions against the risk of infection being introduced from outside. In such countries prophylactics should be used only with the greatest caution.

The discussion on CASEOUS LYMPHADENITIS of sheep was opened by Lieutenant-Colonel REID of New Zealand, and Mr Max HENRY gave an account of the work done on the disease in Australia.

Dr E. A. WATSON of Canada opened the discussion on virus diseases of animals, which dealt mainly with methods of immunizing animals against virus diseases. A resolution was passed emphasizing the need for further research into the nature of viruses and their relations with their hosts, and into problems of diagnosis and control. The Conference also stressed the danger inherent in immunization methods in connexion with newly-recognized virus diseases, and urged the application to virus diseases of methods of eradication, wherever the circumstances of the territory render this policy practicable.

Mr Max HENRY of Australia opened the discussion on LARYNGOTRACHEITIS, INFECTIOUS BRONCHITIS and CORYZA of poultry, and Mr DOBSON, of the Ministry of Agriculture's Veterinary Research Laboratory, read a paper on the disease as it occurs in Great Britain.

The discussion on blowflies of sheep was opened by Dr I. CLUNIES ROSS of Australia, who gave an account of the work done in his country. Dr HOBSON and Mr W. MOORE described investigations that have been carried out in Wales and Scotland respectively.

Professor DALLING opened the discussion on FOWL PARALYSIS and gave an account of what is known of the disease at the present time.

Dr C. S. M. HOPKIRK of New Zealand opened the discussion on BOVINE MASTITIS, and Professor MINETT described those methods of control which have so far been found successful.

Major DUNKIN opened the discussion on JOHNE'S DISEASE, giving an account of the preparation of the diagnostic agent (johnin). The Conference passed a resolution urging on all Governments the necessity of a reliable diagnostic agent in the eradication of the disease.

Captain DATTA, who opened the discussion on CHRONIC BOVINE HAEMATURIA, described the work he has carried out, which has incriminated a fungus of the *Aspergillus* group as a cause of the disease.

GREAT BRITAIN. (1988). **Report of the Agricultural Research Council for the period October, 1935–September, 1937.** pp. vi+378. 2 appendixes. [Numerous refs.] London: H.M. Stat. Off. [8vo] [5s. 6d.]

During the period under review more than three-fifths of the special research grants approved by the Council were allocated to research on animal diseases. Also a large capital expenditure was incurred towards the establishment of a Field Station under the Council's direction. The station is primarily intended to supply disease-free animals of known history and to give adequate facilities for research on a field scale.

The Provisional Note of Administrative Arrangements which was revised in August, 1935, has given the Council wider powers and so increased its usefulness.

The following sections in the report are of special interest:—

**ANIMAL NUTRITION AND HUSBANDRY.**—The question of nutrition and disease is dealt with at the following centres:—“border pining” in sheep in Northumberland, at Armstrong College, Newcastle-on-Tyne; vitamin A-deficiency in pigs at the National Institute for Research in Dairying, Reading and at the Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge; metabolism of fats at the Royal (Dick) Veterinary College, Edinburgh; ketosis in ruminants at the Veterinary Laboratory, Weybridge, the Rowett Research Institute, the Moredun Institute, and the National Institute for Research in Dairying, Reading, and, lastly, iodine deficiency and thyroid disease at the Rowett Research Institute, University College Medical School, and at the Veterinary Laboratory, Weybridge.

**ANIMAL BREEDING.**—The main Institutes concerned with this subject are the Institute of Animal Genetics, Edinburgh and the Small Animal Breeding Institute, Cambridge. At the former, studies on the breeding of poultry and an investigation on the factors which influence the inheritance of milk yield or quality are in progress. At Cambridge, investigations are being carried out on reproduction, causes of sterility, the influence of heredity and management on the quality of carcasses as meat, and the genetics of poultry.

**ANIMAL DISEASES.**—The report refers to the shortage of trained investigators and to the subject of veterinary education, which was being considered by an inter-departmental committee [see p. 194].

Under the heading “Special Researches” a review is given of the work carried out by the specialist committees on the following:—fowl paralysis and coccidiosis, brucella infection, tuberculosis, Johne's disease, braxy, swine fever, necrotic enteritis, helminth disease, mastitis, sheep blowflies, grass sickness and other diseases of horses, and foot and mouth disease.

Under “Miscellaneous Researches”, work on sterility in cows, mortality among calves, lactation tetany and enzootic pneumonia in sheep is reviewed.

In the appendixes a list of grants sanctioned by the Council is given and also a complete index of government departments, institutions and other bodies and scientific subjects referred to or included in the report.—J. C. WALLACE.

GREAT BRITAIN. (1988). **University of Reading, National Institute for Research in Dairying. Annual Report for the Year ending 30th September, 1937.** [KAY, H. D.] pp. 80. 8 tables. Reading: Nat. Inst. Res. Dairying. [4to].

The report consists of two sections: the first deals with changes in staff, appointments, the financial position and an appeal for funds for new buildings, and the second gives the reports of the various departments.

The Institute herd, having passed tuberculin tests without reactors in March and October, 1937, qualified for an official test under the Attested Herds Scheme

of the Ministry of Agriculture and Fisheries. The official tuberculin test in December, 1937, disclosed no reactors, and so a Certificate of Attestation was issued. An attempt to control Contagious Abortion by segregating reactors to the blood agglutination test was made, with encouraging results.

Research work by the Dairy Husbandry Department included such subjects as inheritance of milking qualities, protein requirements of dairy cows, artificial insemination, and nutritional anaemia of pigs, in addition to many others.

The Bacteriology Department continued work on the effect of high temperature short-time pasteurization of milk, mastitis, and the agglutination test for contagious abortion. The Physiology and Biochemistry Department carried out research work on the effect of commercial sterilization on the nutritional value of milk, on the nutritive value of dried and evaporated milk, and on vitamins. Summaries of publications by the staff are given.—J. C. WALLACE.

— (1938). [Work at] **The Rowett Research Institute, Bucksburn, Aberdeen [in 1937].**—*Trans. Highl. agric. Soc. Scot.* 50. 207-208.

The results of an experiment carried out in collaboration with the North of Scotland College of Agriculture showed that few stomach worms develop in well-fed lambs, which received the same number of stomach worm larvae by the stomach tube as did badly-fed lambs.

FOWL PARALYSIS research supported the view that an infective agent is concerned with the aetiology of this disease.

Information is given on an experiment designed to indicate the nutritional conditions which may predispose to PREGNANCY TOXAEMIA in sheep. The work did not confirm the view that lack of exercise and excessive fatness are predisposing causes.—J. C. WALLACE.

INDIA. (1937). **The Annual Report of the Director, Pasteur Institute of Southern India, Coonoor, for the Year Ending 31st December 1936, together with the Thirteenth Annual Report of the Central Committee of the Association for the Year ending 31st March 1937.** [YENGAR, K. R. K.] pp. 89. Numerous tables, 9 appendixes. Madras: The Madras Publishing House Ltd. [8vo].

The number of patients, both European and Asiatic, undergoing antirabic treatment showed a considerable increase over that for the previous year. The shortest period of incubation noted was 11 days (from a jackal bite) and the longest, 257 days (serious bites from a dog). 64,120 c.c. of 5% vaccine (Semple's carbolized sheep vaccine) were issued to the veterinary staffs of Madras Presidency and Indian States. 659 animals (including 536 dogs) were treated, but no results are given. During the years 1923-36, antirabic treatment was given to 3,105 animals, of which 86 died (2.77%) —F. J. ANDREWS.

BASUTOLAND. (1937). [Report of] **Veterinary and Livestock Division [1936-1937].** [HENDERSON, G. T.]—*Rep. Dep. Agric. Basutoland, 1937.* pp. 88-70. 15 tables.

STAFF.—The staff consists of the P.V.O. and eight European agricultural and livestock officers, with native assistants. The total cost was £22,149. An equine improvement scheme provided the services of 20 stallions and seven donkey jacks to approved native residents. Bulls and rams are also provided under schemes for the improvement of livestock. There is only one dipping tank in Basutoland.

ANIMAL CENSUS.—Cattle, 411,981; stallions, 18,796; mares, 45,668; geldings, 25,553; donkeys, 22,766, and mules 1,068.

**ANIMAL DISEASES.**—Twelve cases of ANTHRAX were detected. All cattle are inoculated annually against ANTHRAX with spore vaccine; in infected areas this is done biannually. Other diseases prevalent are:—STRANGLES, BLACKLEG, ACTINOMYCOSIS, PIROPLASMOSIS, ANAPLASMOSIS, AFRICAN HORSE-SICKNESS, and BLUETONGUE (catarrhal fever) of sheep. There has been no SHEEP SCAB for five years. *Melophagus ovinus* infestation and TICK PARALYSIS (caused by *Ixodes rubicundus*) are prevalent. The sheep blowfly is not a menace.

Compulsory monthly treatment of sheep and goats for helminth infestations is proving very satisfactory in restoring these animals to a healthy condition. *Oestrus ovis* (the nasal fly) is very prevalent and causes mortality in the lowlands. *Stomoxys calcitrans* is said to cause mortality after shearing in the lowlands during the wet season. PEDICULOSIS is almost universal. An important part of the division's work is the improvement of sheep and wool.—J. A. GRIFFITHS.

**GOLD COAST COLONY.** (1937). **Report on Animal Diseases, 1936.** [MACKAY, J. M.]—*Rep. med. Dep. Gold Coast, 1936.* pp. 19 and 25-26.

One case of generalized TUBERCULOSIS in an ox was reported. Sporadic cases of ANTHRAX, CONTAGIOUS PLEURO-PNEUMONIA, and EPIZOOTIC LYMPHANGITIS are recorded.

Reference is made to the value and limitations of clearings in the control of human TRYPAOSOMIASIS and the danger of subsequent soil erosion.

The incidence of canine RABIES is declining, although the whole country remains a declared infected area. Ample supplies of the canine vaccine were produced by the Animal Health Department.

A marked fall in incidence of *Cysticercus bovis* occurred in the Tamale area as a result of adequate latrine accommodation in neighbouring villages and the kraaling of cattle outside the villages.

A French Company commenced the importation for slaughter of cattle from the Cameroons.—F. H. MANLEY.

**NYASALAND PROTECTORATE.** (1938). **Report of the Veterinary Department for the Year ended 31st December, 1937.** [DE MEZA, J.] pp. 23. 4 tables. Zomba: Govt. Printer. [fcp] [1s.]

The staff consisted of four veterinary officers, two stock inspectors and 253 natives, and the expenditure was £8,492.

**ANIMAL DISEASES.**—A serious outbreak of TRYPAOSOMIASIS in North Nyasaland interfered with the export trade in cattle to Tanganyika. The disease is controlled by quarantine and the treatment of infected animals. The trypanosomiasis position in the Southern Province was satisfactory; only one serious outbreak of *Tryp. congolense* infection occurred and there were also a few minor outbreaks due to *Tryp. vivax*.

There was an outbreak of EAST COAST FEVER in the Southern Province (a non-enzootic area). This was the only recurrence of the disease since 1921, when dipping measures were first enforced to control outbreaks which occurred in that year. Quarantine and "five-day dipping" with hand dressing brought the outbreak under control. Other tick-borne diseases were kept under control except where regular dipping was not enforced.

No cases of ANTHRAX, BOVINE CONTAGIOUS ABORTION, BLACKLEG, or SWINE FEVER were recorded. [RINDERPEST and CONTAGIOUS BOVINE PLEURO-PNEUMONIA do not occur]. RABIES caused anxiety, and a special committee is sitting to consider means of eradication. There is a local strain of AFRICAN HORSE-SICKNESS (Blantyre strain) which is now incorporated in the Onderstepoort vaccine. Good results

were obtained in a few cases of bovine and canine BABESIASIS treated with acaprin. A large section of the report concerns Animal Husbandry, which is dealt with by the Department.—J. A. GRIFFITHS.

NYASALAND PROTECTORATE. (1938). **Annual Report of the Medical Entomologist for 1937.** [LAMBORN, W. A.]—*Med. San. Rep. Nyasaland, 1937.* pp. 59-61.

The bulk of the report is concerned with tsetse surveys in various parts of the country. Mention is made of the areas in which the fly is diminishing, and the causes contributing to the retreat of the fly are discussed. The main cause of the falling off in the numbers is considered to be the dearth of animal life on which the flies depend for food, and this dearth is coincident with an excessive amount of game shooting. The rifle is now playing the chief part in reclaiming Northern parts of the Dowa and Fort Manning districts. Observations were also made on the parasites of tsetse in Monkey Bay area, but they do not appear to be an important factor in the reduction of the fly there.—F. H. MANLEY.

UGANDA PROTECTORATE. (1938). **Annual Report of the Veterinary Department for the Year Ended 31st December, 1937.** [POULTON, W. F.]—*Rep. vet. Dep. Uganda, 1937.* pp. 3-14. 10 tables.

STAFF.—The British Veterinary staff numbered 12 including the single research officer.

ANIMAL DISEASES.—ANTHRAX is common in Ankole and Masaka, and the prohibition of export of hides and skins from the former was considered. Field work on TUBERCULOSIS was not undertaken; the incidence remains as in previous years. FOWL TYPHOID occurs throughout Uganda. BLACKLEG has a wide distribution. TRYPANOSOMIASIS is wide-spread in the western and northern areas. Details are given of the campaign against RINDERPEST; the Northern Province had no outbreaks and the losses in the Eastern Province were not serious. Three tables show the number of outbreaks and the number and distribution of inoculations and vaccinations. FOOT AND MOUTH DISEASE control had to be relaxed owing to numerous outbreaks and the disease is now wide-spread. The strict quarantine control measures prevented the spread of CONTAGIOUS BOVINE PLEURO-PNEUMONIA from the Karamoja. One case of RABIES was reported in the West Nile District, Northern Province.

The work on *Glossina* investigation and reclamation was carried out with increased vigour during the year. There is a reduction of *Gl. morsitans* throughout South Ankole—in one area the takings of tsetse flies were reduced to under 40 in over a month as against hundreds a day four years ago.

The report concludes with sections dealing with other aspects of animal industry.—J. C. WALLACE.

UGANDA PROTECTORATE. (1938). **Annual Report of the Senior Veterinary Research Officer, Entebbe, for 1937.** [CARMICHAEL, J.]—*Rep. vet. Dep. Uganda, 1937.* pp. 17-24. 1 table.

Laboratory products issued were:—RINDERPEST serum 8,395 litres, and rinderpest vaccine, 344.9 litres. The total routine examinations of material for diagnosis numbered 11,791.

The output of rinderpest vaccine exceeded that of previous years. It was noted that the vaccine when kept for nine months under field conditions lost 75 % of its immunizing properties; a dose of 40 c.c. was necessary in adult cattle instead of 10 c.c. Experiments to establish a neurotropic strain of the rinderpest virus in the brains of white mice were not successful. An attempt to grow the virus

on the chorio-allantoic membrane of developing chicks failed. Rinderpest was studied in certain species of African antelope; the very rapid course of the disease is referred to, *e.g.* death in 48 hours after the onset of symptoms in bushbuck and sitatunga, and in 24 hours in reedbuck and oribi.

Ankole and zebu cattle were found to be fairly resistant to artificial infection with *Trypanosoma rhodesiense*. Surfen C gave unsatisfactory results in the treatment of calves infected with *Tryp. congolense*.

Investigations on the relationship between EAST COAST FEVER and TURNING SICKNESS were continued. The chronic case referred to in last year's report is still under observation—the animal is in good condition and shows turning movements at intervals. Attempts to transmit turning sickness failed, but studies of P.M. lesions suggest a close connexion with E.C.F. Research into the comparative susceptibility of zebu and ankole cattle to tuberculosis has been commenced. ACTINOMYCOSIS was diagnosed for the first time in Uganda; the material sent to the laboratory was a retropharyngeal gland from a Karamojan bullock.

Experiments were made to determine the thermal death point of *Cysticercus bovis*. Cysts in warm ox bile-saline were unaffected by a temperature of 45°C. for half an hour, but 75% were killed at a temperature of 50°C. in one minute. Details are given of an investigation into the cause of deaths in hippotamuses in the Lake George-Kazanga Channel area. The work is in an early stage.—J. C. W.

**ZANZIBAR PROTECTORATE. (1938). Report on Veterinary Work in 1937.** [MILLER, R. W. R. (Director of Agriculture).—*Rep. Dep. Agric. Zanzibar, 1937*. pp. 8-10.

Fazal Din Ahmedi was appointed Veterinary Officer.

There are approximately 35,000 cattle in the Protectorate. The large herds exist near the Town boundaries, most of them being at Mtoni Government Plantations; they consist largely of African, Indian and European cross-bred types. Goats are numerous, but the exact number is not known. Cattle, goats and sheep are imported for slaughter. Other imported animals pass through quarantines, where the cattle are double-dipped.

No tsetse fly exist on the island. Trypanosomiasis was detected in 1% of the cattle at Mtoni. The infected animals were slaughtered.

Animal husbandry has been neglected except in the region of Zanzibar Town. Castration of scrub bull calves has commenced. One cattle importer has started shade drying of hides and skins.

Two pupils have been attached to the Veterinary Officer for training in assistant's duties.—F. H. MANLEY.

**HONG KONG. (1938). Annual Report of the Colonial Veterinary Surgeon for the Year 1937.** [MACKENZIE, W. J. E.] pp. 5. 1 table. [8vo].

**ANIMAL PRODUCTS.**—390,519 swine, 72,218 cattle and 18,502 sheep and goats were admitted to the abattoir, of which the revenue was 242,302 dollars. 15,154 lb. of diseased meat were destroyed. A large amount of lard and other pork products were exported.

**ANIMAL DISEASES.**—In the depots amongst other diseases, 63 cases of SWINE ERYSIPELAS, 36 cases of FOOT AND MOUTH DISEASE in cattle, and 23 cases of SWINE FEVER were encountered. Statistics for the quarantine station are given; three cases of GLANDERS were encountered.

Two cases of RABIES were confirmed by the Government Bacteriologist.  
—F. H. MANLEY.

TRINIDAD AND TOBAGO. (1937). **Annual Medical and Sanitary Report for the year ended on the 31st December, 1936.** [RANKINE, A.] pp. 60. Numerous tables, 2 maps. Trinidad and Tobago: A. L. Rhodes, Govt. Printer. [fcp] [60c.]

RABIES.—Four human and 228 animal cases of paralytic rabies are reported. In 21 bats of abnormal habits the virus of rabies was determined by animal inoculation and the detection of Negri bodies, and in 16 others by animal inoculation only. Bats were seen fighting with each other and with cats, dogs and goats.

The incubation period in artificially inoculated bats ranged from 9 to 105 days. The symptoms in bats are described, and it was shown that recovery in the bat is possible, and that the recovered animal may be a carrier of the disease. The difficulty of control under these circumstances is pointed out. The scheme for the destruction of *Desmodus* bats continues. 3,623 were captured, and 2.7% showed Negri bodies. Vaccine is prepared for human and animal inoculation.

UNDULANT FEVER.—Preliminary observations indicated that a high percentage of human sera reacted to *Brucella abortus* and *Br. melitensis*.—F. H. MANLEY.

UNITED STATES OF AMERICA. (1935). **Report of the Chief of the Bureau of Animal Industry for the Year Ending June 30th, 1935.** [MOHLER, J. R.] pp. 55. 24 tables. Washington: U.S. Govt. Printing Office. [8vo] [5 cents].

A short introduction dealing with certain features of the work is followed by reports of each division of the Bureau.

ANIMAL HUSBANDRY DIVISION. [SHEETS, E. W., SPENCER, D.A., and MCPHEE, H. C.]

Investigations on the inbreeding of swine and also of g. pigs were continued. Feeding experiments on rats and pigs to determine the influence of food intake on growth and development are recorded. The division carried out investigations on dressed meat, beef and dual-purpose cattle, feeding of sheep, goats' milk, wool, breeding and feeding of swine, and the rearing of foals.

Research on poultry breeding, physiology, hatchability of eggs, and feeding was carried out. Earlier work showing that excessive quantities of cod-liver oil (more than 4% of the total feed consumed) decreased egg production and hatchability was confirmed.

BIOCHEMICAL DIVISION. [DORSET, M.]

Data are presented of tests on the germicidal power of various dyes, of benzylphenol and of chlorinated phenol derivatives.

An experiment on the use of the whole-blood stained-antigen test for the diagnosis of *Brucella abortus* INFECTION gave encouraging results.

The amounts of tuberculin and mallein issued were:—3,135,400 c.c. of intradermal tuberculin, 8,280 c.c. of avian tuberculin, and of 1,233 c.c. of mallein.

Results of work on three vaccines against SWINE FEVER are given, *viz*, glycerinated, phenolized and crystal violet. The last-mentioned was most successful, and further research is being undertaken.

EXPERIMENT STATION. [COTTON, W. E.]

*Brucella abortus* INFECTION.—One experiment, in which 20 heifers were inoculated with various amounts of live culture and infected *via* the conjunctiva after service, indicated that the dose of vaccine was not very important, and probably a small dose of live vaccine is adequate for immunization. In another experiment the results of calfhood vaccination were compared with those of vaccination of yearling maiden heifers. Further work is necessary before definite conclusions are possible.

**TUBERCULOSIS.**—Studies in the so-called “ skin tuberculosis ” were continued but no scientific progress was made.

**VESICULAR EXANTHEMA OF SWINE.**—Lesions of this disease resemble so closely those of vesicular stomatitis and foot and mouth disease that inoculation of animals is necessary to differentiate between them. G. pigs, cattle, sheep and goats appear to be immune to the virus.

**FIELD INSPECTION DIVISION.** [POPE, G. W.]

**MANGE.**—The number of sheep in flocks in which infection was found totalled 79,960. Cattle mange eradication did not make much progress and the emergency movement of cattle owing to the drought caused spread of this disease. The number of cattle in infected herds was 219,338. This division is also concerned with preventing the entry into the country of contagious animal diseases, and the inspection and humane handling of export animals.

**MEAT INSPECTION DIVISION.** [STEDDOM, R. P.]

Statistics on disease conditions found in the state abattoirs are given. 72,736,000 animals were slaughtered under inspection in 746 establishments.

**PACKERS AND STOCKYARDS DIVISION.** [MILLER, A. W.]

This section deals with the operation of stockyards under the laws regulating their work.

**PATHOLOGY DIVISION.** [SCHOENING, H. W.]

Three cases of **GLANDERS**, ten cases of **DOURINE** and one of **RABIES** were diagnosed.

**RESEARCH.**—Reports are given of investigations on the following conditions:—bovine mastitis, swine erysipelas, actinomycosis, equine infectious encephalomyelitis, equine infectious anaemia, rabies, “ cornstalk ” disease, “ alkali disease ”, and shipping fever.

A list of plants, etc., tested for poisonous properties is given. Experiments to find an antidote for cyanide poisoning indicated that a combination of sodium nitrite and sodium thiosulphate was most promising.

**DIVISION OF TICK ERADICATION AND SPECIAL DISEASES.**

[MACKELLAR, W. M.]

Tick eradication showed further progress, no new areas being requarantined and 12,800 square miles of territory being released.

Thirty Bureau veterinarians were engaged in **SWINE FEVER** eradication, and 2,256 outbreaks were reported during the year.

**TUBERCULOSIS ERADICATION DIVISION.** [WRIGHT, A. E.]

The eighth survey, completed in May, 1935, revealed the approximate degree of bovine tuberculosis for the entire country to be 0.6% as against 4% at the first survey in 1922. During the year, 25,237,532 tuberculin tests were carried out on cattle. The percentage of reactors was 1.5 as in 1934. 5,590,863 herds were under supervision at the end of the year. From 1917 to 1935, 3,302,561 reactors were removed from herds. Twenty-two states and 79% of all counties in the U.S.A. were “ modified accredited areas ” on June 30th, 1935. Tuberculosis was found in 7,508 flocks of poultry out of 345,000 situated in 21 states.

According to tests with avian tuberculin and johnin, John's disease existed to a slight degree in 11 states. 5.4% of the total number tested were condemned on account of this disease.

A campaign for the eradication of *Brucella abortus* **INFECTION** was commenced in July, 1934; 3,819,065 cattle were subjected to the agglutination test and 11% reacted. The tests were conducted in four states and indicated that about 40% of the herds were infected.

A plan for the eradication of MASTITIS was put into operation. Clinical examination of 3,808 herds, comprising 95,000 cattle, resulted in the removal of 11,683 advanced cases.

DIVISION OF VIRUS-SERUM CONTROL. [SKIDMORE, D. I.]

This division supervises the commercial preparation of biological products for use against animal diseases, and a list of those manufactured is given, 82 establishments being licensed for the purpose.

ZOOLOGICAL DIVISION. [HALL, M. C.]

Research on protozoan and helminth parasites is recorded, and also experiments on the treatment of animals infested with internal and external parasites.

Studies on STRONGYLOSIS of horses showed that deep ploughing was of value in controlling this condition. Field investigations on the infestation of cattle with liver fluke indicated that lasting results depend primarily on effective drainage.

STEPHANOFILARIASIS, a skin disease of bovines, is known to have occurred in 14 States. Investigations were carried out on the life-history of the parasite causing the disease.—J. C. WALLACE.

UNITED STATES OF AMERICA. (1936). **Report of the Bureau of Animal Industry for the Year Ending June 30th, 1936.** [MOHLER, J. R.] pp. 60. 24 tables. Washington: U.S. Govt. Printing Office. [8vo] [10 cents].

About 10,000 carcasses out of 62,000,000 inspected were condemned for bovine TUBERCULOSIS during the year, as compared with 28,000 in 1935. The U.S.A. remained free from FOOT AND MOUTH DISEASE, RINDERPEST, CONTAGIOUS PLEURO-PNEUMONIA and SURRA during the period under review.

ANIMAL HUSBANDRY DIVISION. [MCPHEE, H. C.]

Numerous investigations in relation to livestock improvement are recorded, and include such subjects as dressed meat, beef and dual-purpose cattle, feeding of sheep, goats' milk, wool, breeding and feeding of swine, breeding of draught horses, and breeding and feeding of poultry.

It is noted that 75% of the states have adopted the national poultry improvement plan, which started on July 1st, 1935. Its objectives are:—(a) the improvement of breeding qualities of poultry; (b) the reduction of losses from PULLORUM DISEASE, and (c) the adoption of a more uniform terminology to describe breeding poultry, hatching eggs and chicks.

BIOCHEMICAL DIVISION. [CHAPLIN, R. M.]

Work on the crystal-violet vaccine against SWINE FEVER was continued. Immunity appeared to be established at 14 days. Of 152 pigs vaccinated and subsequently exposed to virus, 181 remained healthy, 17 showed slight reactions and four severe reactions, but none died.

Data on various tests of the germicidal powers of dyes are presented. The work of the division also included tests of dips, disinfectants, antiseptics and anthelmintics.

The amounts of tuberculin and mallein issued were:—1,965,000 c.c. of intradermal tuberculin, 10,400 c.c. of avian tuberculin and 2,167 c.c. of mallein.

Abortin was being tried and results were said to be promising, but no details are given in this report.

The result of a field experiment, using 18,000 cattle, to test the whole-blood stained antigen method for the diagnosis of *Br. abortus* INFECTION indicated that it was satisfactory, but veterinarians conducting the test required special training and equipment.

# ANIMAL DISEASE STATION. [COTTON, W. E.]

*Brucella abortus* INFECTION.—Studies in calfhood vaccination were continued. Laboratory experiments to the end of the year indicated that the method was "80% effective". A field experiment was commenced.

TUBERCULOSIS.—A paper dealing with the causes of sensitization of cattle to tuberculin other than that due to bovine tubercle bacilli was prepared. An investigation into the source of infection responsible for the introduction of tuberculosis into the herd of the bureau of Dairy Industry, Beltsville, was carried out.

# FIELD INSPECTION DIVISION. [POPE, G. W.]

MANGE.—The total number of sheep in flocks in which sheep scab was found was 160,877. Cattle mange showed a slight increase over 1935; the number of cattle in infected herds was 280,489. No cases in horses were reported during the year.

The division was also concerned with preventing the entry into the country of contagious animal diseases and with the inspection and humane handling of export animals.

# MEAT INSPECTION DIVISION. [PISTOR, A. J., and JOSS, E. C.]

Statistics on disease conditions found in the state abattoirs are given. 61,970,474 animals were slaughtered under inspection in 725 establishments.

# PACKERS AND STOCKYARDS DIVISION. [MILLER, A. W.]

This section deals with the operation of stockyards under laws regulating their work.

# PATHOLOGY DIVISION. [SCHOENING, H. W.]

One case each of GLANDERS and DOURINE and two cases of RABIES were diagnosed.

RESEARCH SECTION.—A report is given on the progress made in research on bovine mastitis, swine erysipelas, *Brucella suis* infection, equine infectious encephalomyelitis, equine infectious anaemia, and avian infectious laryngotracheitis. Experiments carried out on the use of sodium bicarbonate as a preventive against shipping fever seem to show that this remedy is unreliable.

Fourteen cases of suspected TUBERCULOSIS in sheep were studied. Examination of 11 specimens was completed and in each case it was shown that the avian type of tubercle bacillus was responsible. Details are given of work undertaken in co-operation with the Zoological Division on the application of the complement-fixation test in the diagnosis of ANAPLASMOSIS. It was ascertained that the test was not satisfactory for the detection of carriers.

# DIVISION OF TICK ERADICATION AND SPECIAL DISEASES. [MACKELLAR, W. M.]

Tick eradication showed further progress, 5,582 square miles of territory being released from quarantine.

Thirty Bureau veterinarians were engaged in swine fever eradication and 8,882 outbreaks were reported during the year.

# TUBERCULOSIS ERADICATION DIVISION. [WIGHT, A. E.]

During the year, 22,918,088 tuberculin tests were carried out on cattle. The percentage of reactors was 0.7, as against 1.5 in 1935. 6,515,273 herds were under supervision at the end of the year. Between 1917 and 1936, a total of 3,468,057 reactors were removed from herds. The number of states in the "modified accredited area" on June 30th, 1936, was 40. Tuberculosis was found in 6,000 flocks of poultry out of 287,449 situated in 21 states.

According to tests with avian tuberculin and johnin, Johne's disease existed to a slight degree in 11 states; 5.2% of the total number tested were condemned.

The voluntary campaign for the eradication of *Br. abortus* INFECTION was continued. About 6,600,000 cattle were subjected to the agglutination test and 7% reacted.

Under the MASTITIS plan, 8,993 herds containing 140,435 cows were clinically examined, and 16,756 advanced cases were removed.

#### DIVISION OF VIRUS-SERUM CONTROL. [SKIDMORE, D. I.]

This division supervises the commercial preparation of biological products for use against animal disease, and a list of doses manufactured is given. Seventy-seven establishments were licensed for this purpose.

#### ZOOLOGICAL DIVISION. [HALL, M. C., and SCHWARTZ, B.]

Data are presented on experiments on the treatment of animals infested with internal and external parasites.

The study of the development and comparative morphology of infective horse strongyle larvae was continued. Experiments showed that, when horse faeces containing strongyle eggs were buried [depth not stated], the eggs hatched and the larvae migrated to the surface in all kinds of soils.

Other investigations recorded include:—the effect of small intestinal trichostrongyles on food required and wool produced by sheep, the control of liver fluke in sheep and cattle, diagnosis of anaplasmosis in carriers, and immunization against anaplasmosis, warbles, lungworms in swine and trichinosis.—J. C. WALLACE.

UNITED STATES OF AMERICA. (1937). **Report of the Bureau of Animal Industry, for the Year Ending June 30th, 1937.** [MOHLER, J. R.] pp 64. 23 tables. Washington: U.S. Govt. Printing Office. [8vo] [10 cents].

In the introduction, reference is made to the progress of the Tuberculosis Eradication Campaign and experiments on calfhood vaccination for *Brucella* infection which are dealt with below.

#### ANIMAL HUSBANDRY AND ANIMAL NUTRITION DIVISIONS.

[MCPHEE, H. C., and HOWE, P. E.]

The Animal Husbandry Division carried out research in livestock breeding and management, and the Animal Nutrition Division in livestock nutrition and feeding, including the chemistry of food and animal products. The investigations covered such subjects as dressed meat, breeding and feeding of small animals, beef and dual-purpose cattle, feeding and breeding of sheep, goat's milk, wool, feeding and breeding of swine, and poultry breeding and feeding.

#### BIOCHEMICAL DIVISION. [CHAPIN, R. M.]

Work on the crystal-violet vaccine against SWINE FEVER was continued; very good results are claimed. Experiments showed that the antigenic power of the vaccine was inhibited by anti-hog cholera serum given about a month before or a week after vaccination; the protection given to sucking pigs from immune sows was also unsatisfactory.

Work on dips, disinfectants, antiseptics and anthelmintics also occupied the division.

The amounts of tuberculin and mallein issued were:—1,854,470 c.c. of intradermal tuberculin, 16,760 c.c. of avian tuberculin, and 856 c.c. of ophthalmic mallein. Experiments with abortin proceeded, but definite conclusions were not available.

#### ANIMAL DISEASE STATION. [COTTON, W. E.]

*Br. abortus* INFECTION.—Details are given of calfhood vaccination experiments and it is noted that field trials were being conducted. Studies in the transmission

of *Br. suis* indicated that after exposure to infection for brief periods, cattle might react to the agglutination test, but that the danger of cattle becoming infected was negligible.

**TUBERCULOSIS.**—Examination of the reactors from the herd of the Bureau of Dairy Industry Experiment Station, Beltsville, indicated that the infecting organisms were of only moderate virulence. Studies on so-called skin lesion cases were continued.

**VESICULAR EXANTHEMA OF SWINE.**—Experimentally, this disease is not highly contagious and, in this respect, resembles vesicular stomatitis more closely than foot and mouth disease.

**FIELD INSPECTION DIVISION.** [POPE, G. W., and FLADNESS, S. O.]

**MANGE.**—The number of sheep in flocks in which sheep scab was found totalled 42,998. Cattle mange was found in 388 herds containing 229,277 cattle. No cases of mange in horses were reported during the year. Mange was reported as still present in goats in Texas.

The division is also concerned with preventing the entry into the country of contagious animal diseases, and with the inspection and humane handling of export animals.

**MEAT INSPECTION DIVISION.** [JOSS, E. C.]

Statistics on disease conditions found in the state abattoirs are given. 71,228,306 animals were slaughtered under inspection, in 712 establishments.

**PACKERS AND STOCKYARDS DIVISION.** [MILLER, A. W.]

This section deals with the operation of stockyards under laws regulating their work.

**PATHOLOGY DIVISION.** [SCHOENING, H. W.]

One case each of **GLANDERS** and of **RABIES** were diagnosed. No cases of **DOURINE** were found.

Data are presented of investigations on the following conditions:—mastitis, tuberculosis, swine erysipelas, actinomycosis, equine encephalomyelitis, equine infectious anaemia, and anaplasmosis. Examination of material from 16 suspected cases of **TUBERCULOSIS** in sheep revealed acid-fast organisms in 15 specimens, the causal organism in each case being demonstrated as the avian type of tubercle bacillus.

A list of poisonous plants tested is given. Further studies of bighead in sheep showed that certain foods were a predisposing factor in the cause of this disease by *Tetradymia glabrata*.

**DIVISION OF TICK ERADICATION AND SPECIAL DISEASES.** [MACKELLAR, W. M.]

Tick eradication showed further progress, no areas being requarantined during the year; 28,150 sq. miles of territory were released.

Thirty Bureau veterinarians were engaged in swine fever investigation and control, and 3,522 outbreaks were reported during the year.

**TUBERCULOSIS ERADICATION DIVISION.** [WIGHT, A. E.]

During the period under consideration 13,750,308 tuberculin tests on cattle were carried out. The percentage of reactors was the same as in 1936, *viz.* 0.7. 6,745,471 herds were under supervision at the end of the year. Between 1917 and 1936 a total of 3,562,161 reactors were removed from herds. The number of states in the "modified accredited area" on June 30th, 1937, was 44. The condemnations of cattle carcasses for bovine tuberculosis were less than two-thirds as many as in 1936. Tuberculosis was found in about 3,000 flocks of poultry out of 128,851 situated in 12 States.

According to tests with avian tuberculin and johnein, Johne's disease existed to a slight degree in 11 states; 6.2% of the cattle tested were removed.

The voluntary campaign for the eradication of CONTAGIOUS ABORTION was continued. About 8,021,000 cattle were subjected to the agglutination test and 5% reacted. Experiments on calfhood vaccine for the prevention of this disease continued to give encouraging results.

#### DIVISION OF VIRUS-SERUM CONTROL. [SKIDMORE, D. I.]

This division supervises the commercial preparation of biological products for use against animal diseases; a list of doses manufactured is given. Seventy-six establishments were licensed for this purpose.

#### ZOOLOGICAL DIVISION. [SCHWARTZ, B.]

Data are given of experiments on the treatment of animals infested with internal parasites.

Studies on the effects of ploughing on the eggs and larvae of horse strongyles were continued. The division co-operated with the Pathological Division in experiments to ascertain whether strongyles were concerned in the transmission of EQUINE INFECTIONS ANAEMIA.

Other research recorded includes:—parasitic diseases of ruminants, *e.g.*, anaplasmosis, coccidiosis, liver fluke, tapeworms, nematodes and warbles; parasites of swine, *e.g.*, trichinae and stomach worms, and parasites of poultry, *e.g.*, gape-worm and tapeworms.—J. C. WALLACE.

#### Extracts from Annual Reports of Agricultural Experimental Stations U.S.A.

[The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports will be found in *Index Veterinarius*].

ARIZONA, 1936-37. Study was made on INFECTIOUS KERATITIS or pink eye of cattle, animal parasites, poisonous plants (*Senecio sp.*, *Astragalus praelongus*, *Stanleya*) and on the bacterial flora of milk.

FLORIDA, 1936-37. A list of locally important diseases is given. Studies were made on BRONCHO-PNEUMONIA in calves, FOWL PARALYSIS and allied conditions, "salt sick", a nutritional anaemia of cattle (trials with copper and cobalt), bone fragility, and on rodent control, for which thallium sulphate baits were found more successful than BaCO<sub>3</sub> or squill.

HAWAII, 1937. Research was conducted on *Fasciola gigantica* (biology and control), porcine and poultry helminths, experimental anaemia in rats, and the control of rats on the island.

KENTUCKY, 1937. Studies on *Corynebacterium equi* showed that there were two agglutinative types, one isolated from fowls and the other from mares and foetuses, the former causing PNEUMONIA. *Salmonella typhi-murium*, an enzootic infection of pigeons, was found to lack the V factor of White and Kauffman. *S. newport* was isolated from swine and fowls, *S. new brunswick* n. sp. from fowls (formula III XV: lv: 1, 7) and *S. kentucky* from fowls (formula VIII XX: i-z6: -). Mastitis was found to be more prevalent in cows with brucella infection than in those without. Data are presented on breeding records in cattle herds. Research, as yet inconclusive, was carried out on PERIODIC OPHTHALMIA. Manganese (86 p.p.m. in the ration) was effective in preventing slipped tendon in chicks and the hatchability of eggs of Mn-deficient hens was very low; in addition, monster chicks resulted.

MASSACHUSETTS, 1937. Statistical information is given on poultry disease control, and notes are included on *Erysipelothrix rhusiopathiae* infection in turkeys, "epidemic tremor" in chicks (believed to be due to a filtrable virus), viability of *S. pullorum* (which was viable in dry cloth for five years), and on FOWL LEUCOSIS and allied diseases.

NEW HAMPSHIRE, 1937. Short notes are given on BOVINE MASTITIS, haemolytic streptococci in milk, calf vaccination against BOVINE BRUCELLOSIS, PULLORUM DISEASE eradication, AVIAN COCCIDIOSIS, and vitamin A requirements of poultry.

TEXAS, 1936. During the year work was done on eradication of BRUCELLOSIS from the station herd, ANAPLASMOSIS, inheritance of cryptorchidism in goats, slipped tendon in chicks, swellhead of sheep and goats (toxic and photosensitizing principles of *Lechuguilla*), *Sartwellia flaveria* poisoning, and on the toxic principle of loco (*Astragalus earlei*).

WASHINGTON, 1936-37. The Hotis test was found useful in the diagnosis of mastitis; better results were obtained when normal bovine blood serum was added.

WISCONSIN, 1936-37. Notes are given on the following:—abnormal milk; immune bodies in the blood serum of brucella-infected cattle; "ceased reactors" (BRUCELLOSIS); avian COCCIDIOSIS and its prevention by sulphur, and the tendency to rickets in chicks so treated; cleft palate inheritance in swine, and fertility in bulls.—J. E.

U.S.A. (1936). **Tenth Annual Report of the New York State Association of Dairy and Milk Inspectors Meeting at Schenectady, New York.** pp. 247. Numerous text figs., 1 fig. on 1 plate, numerous tables. [Numerous refs.] Albany, N.Y.: New York State Department of Health. [8vo].

The report consists of a number of articles dealing with various public health aspects of the milk problem. There are papers and discussions on dairy hygiene, the mastitis problem, the bacterial content of milk and its nutritive value, pasteurization and the duties of the milk inspectors. [Abstracts of individual articles appear elsewhere in this number].

## BOOK REVIEWS

ASTOR [Viscount], & ROWNTREE, B. S. (1938). **British Agriculture. The Principles of Future Policy.** pp. xx + 469. 20 figs., 66 tables. London: Longmans, Green and Co. [8vo] [15s.]

This book is a detailed review of all aspects of the agricultural industry with recommendations on basic principles by which it is considered that the national agricultural policy ought to be guided in the future.

The book is divided into five parts embracing 28 chapters, of which those on Objectives of Agricultural Policy, The Changing Situation of British Agriculture, on the various crops, on the different farm animals, Milk Production, Farming and Research, Education and Advice, are of interest to readers of this *Bulletin*.

Veterinary interest is particularly concerned with those parts dealing with the existing handicaps with reference to losses from disease. Quotations are made from various well-informed sources—chiefly from the reports of special committees of enquiry.

Amongst the recommendations, the position of research into livestock diseases is reviewed; the paucity of national funds hitherto applied to veterinary research is deplored and the importance of increasing them is stressed. It is also proposed

that the agricultural advisory services should be reorganized on a provincial basis [cf the PEP report below] and developed to improve the dissemination of research discoveries. The appointment of advisory experts on each animal species is also advocated [as in the PEP report].

The book is extremely interesting and is especially valuable in that it gives a worker in one special agricultural science a balanced insight into all branches.—J. E.

- , (1938). **Report on Agricultural Research in Great Britain.** pp. 146. 7 tables, 7 appendixes. London: PEP, 16 Queen Anne's Gate, London, S.W.1. [4to] [8s. 6d.]

This report has been produced by a body of voluntary workers enrolled in an organization named PEP (Political and Economic Planning) which has undertaken the duty of examining the present state of various national activities and of making suggestions for improvements.

In this report all branches of agricultural research have been considered, including animal husbandry and animal pathology. Reports and publications of the Ministry of Agriculture, Development Commission, Agricultural Research Council, and Imperial Agricultural Bureaux, etc. have been closely studied, with the result that this report is a very valuable, up-to-date survey of all aspects of the matter, and contains a wealth of detail of great reference value.

There are special chapters on The Structure of Agricultural Research in Great Britain, The Finance of Agricultural Research, The Personnel of Agricultural Research, The Spreading of Scientific Knowledge about Agriculture, and on Agricultural Research Outside Great Britain. Finally there is one entitled Criticisms and Conclusions. There are also seven appendixes giving details of institutions, departments, staffs, costs and other matters.

The chief criticism made is that the link between research and farming is too weak. Many suggestions for improvement in agricultural research are made, chief of which are:—that the Agricultural Research Council should be given wider financial and executive powers, and more extensive control of the organization of research as well as of advisory and extension services; that the functions of the Imperial Agricultural Bureaux and the advisory services should be extended to cover husbandry organized to deal with individual crops and animals—e.g., a Bureau and advisory service on sheep alone, swine alone, and so on—and that a central extension service should be founded. For details of these, and of other points too numerous to mention, the reader should consult the original.—J. E.

- REMLINGER, P. [Directeur de l'Institut Pasteur de Tanger], & BAILLY, J. [Chef de service à l'Institut Pasteur de Tanger]. (1938). *La maladie d'Aujeszky. [Aujeszky's Disease]*. pp. 204. 16 figs., 18 tables. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 45].

As Aujeszky's disease is known to be relatively wide-spread in many countries, an authoritative survey of recent advances is particularly welcome. The present volume can be warmly recommended as a valuable contribution to our knowledge of the disease.

It is natural that the authors should have drawn extensively on the results of their own work, and numerous personal experiments are quoted in detail. The subject matter is divided into the following main headings:—natural and experimental infections, methods of infection and distribution of the virus in the body, physico-chemical properties of the virus, diagnosis, treatment, and immunity, etc.

The review of the investigations of other workers is admirable, but the book would have possessed an added attraction if certain important articles had not been overlooked. For example, under the heading of ultrafiltration, full details are given of the authors' experiments on the attempted filtration of the virus through collodion membranes with results which were practically negative, while the important observations of ELFORD and GALLOWAY [*V. B.* 7. 380.], on the filtration and estimation of the size of the virus, are completely ignored.—R. E. G.

WIRTH, D. [O. Professor der Tierärztlichen Hochschule in Wien], & ZWICK, W. [Dr. Med. Vet. H.C., Dr. Sc. Nat., Emerit. O. Professor der Universität Giessen]. (1938). *Kompendium der Speziellen Pathologie und Therapie für Tierärzte. [Special Pathology and Therapeutics for Veterinarians]*. pp. xiv + 428. Stuttgart: Ferdinand Enke. [8vo] [RM. 25].

Professor FRÖHNER, who was responsible for the first three editions of this book, and, in conjunction with Professor Zwick, for the fourth, has relinquished the task to Professor WIRTH and is enjoying a well earned retirement. The book has been enlarged and thoroughly revised, although remaining a compendium which is not in any way intended to take the place of the more detailed texts of HUTYRA and MAREK, JOEST, or KITT. The student and practitioner will find in it a brief but comprehensive summary of all the commoner and most of the more rare diseases of the domestic animals as well as those affecting birds and bees.

Diseases are mainly considered under such headings as aetiology, symptoms, diagnosis, pathological anatomy, and therapy. In the first part of the book they are classified according to the organs involved, and the infectious diseases of the various species are dealt with in the second part. Modern views are given on such conditions as leptospiral infection in dogs, trichomoniasis in cattle, neurolymphomatosis in fowls, tularaemia in man and animals and "Isle of Wight disease" in honey bees.

There are no illustrations, however, and the index is not without errors. The book should be useful to students and practitioners but is hardly suitable for the research worker.—E. G. WHITE.

OESTERLIN, M. [Institut für Schiffs- und Tropenkrankheiten, Hamburg]. (1939). *Chemotherapie. Ergebnisse, Probleme und Arbeitsmethoden. [Chemotherapy]*.—pp. viii + 359. 39 figs. [Numerous refs.] Brunswick: Friedr. Vieweg & Sohn. [8vo] [RM. 22.50].

The author is a pupil of GIEMSA, and is working at the Institute for Tropical Diseases at Hamburg. As would be expected, he has produced a very satisfactory introduction to the chemotherapy for tropical diseases. The book contains a general discussion of the problem and also a chapter on the question of the resistance of the organisms to chemotherapeutic agents, but its most important parts deal with the problem from the biological and chemical aspects.

One section of the book describes the life-history of the parasites and the method of infection, whilst in the chemical part the various diseases are discussed. The author also deals with methods of demonstrating the chemical agents in the parasites.

An excellent feature is the bibliography attached at the end of each division. The book is well illustrated and indexed, and should prove of great value to those beginning the study of the subject in detail.—J. M. ROBSON.

SCHMIDT, C. L. A. [M.S., Ph.D.; Professor of Biochemistry, University of California], & ALLEN, F. W. [Ph.D.; Instructor in Biochemistry, University of California]. (1988). **Fundamentals of Biochemistry with Laboratory Experiments**. pp. xiv. + 888. 29 figs., 24 tables, 1 appendix. London: McGraw-Hill Publishing Company Ltd. [1st Edit.] [8vo] [18s.]

In view of the large number of excellent books on the fundamentals of biochemistry, one looks for the established knowledge to be presented from a fresh aspect in any new book that appears upon the subject. The present volume aims at being a compromise between a theoretical and a practical book. Its object is "to give the student a background for his laboratory work (and) the aim of the laboratory work is to illustrate some of the facts of biochemistry". The authors admit that "it is expected that the laboratory course will be supplemented by lectures" and this course is presumably that taught in the University of California. While, therefore, in this course the deficiencies in the theoretical portions of the book are no doubt remedied in the lectures, providing an adequate groundwork for the student biochemist, the somewhat sketchy treatment of the theory must necessarily limit the usefulness of the book for external students.

As a whole the book lacks balance both in the relationship between the theoretical and practical work and in the relative weight attached to the various sections treated. As much space is devoted to informing the student how to utilize a set of logarithmic tables as to the importance of the trace elements. In view of the widely recognized importance of cobalt in nutrition it is surprising to read that "nickel and cobalt are probably not essential elements". The standard Denis method for the estimation of serum magnesium is not mentioned, the far less extensively used 8-hydroxyquinoline method being the one taught. The preface states that "the technique used in laboratory work, while important, is incidental to the main object of the work" and yet four different methods for the estimation of blood glucose are recommended for practice by the student. Further, the excellent system of advising the reading of specified original works in connexion with each aspect of the subject loses some of its value, especially for students in countries other than the U.S.A., when practically all the works cited are American publications by American authors. A wider bibliography is certainly desirable and would be much more useful.

The treatment of the more fundamentally chemical aspects of the subject is good, the formulae presented being very clear, and it is interesting to note that some of the recent advances into the chemistry of sex hormones and of carcinogenic substances are included. It is suggested that for future editions, elaboration of the subject matter such as is no doubt supplied in the concomitant lectures, be included in the book to give it a more balanced aspect and hence render it of much wider general appeal.—ALFRED EDEN.

ANON. (1988). **The Pharmaceutical Pocket Book**. pp. 370. 1 fig., numerous tables. London: The Pharmaceutical Press. [13th Edit.] [8vo] [5s.]

This book is published by the Council of the Pharmaceutical Society of Great Britain, and contains a wealth of information of importance to pharmaceutical and analytical chemists, on dispensing, posology, analysis of fluids and foods, weights and measures, poisons and many other items.

It is of great value to veterinarians, whether in practice or research, and there is a veterinary posological table for B.P. and B.P.C. drugs.—J. E.

# IMPERIAL BUREAU OF ANIMAL HEALTH

## THE VETERINARY BULLETIN

---

---

Vol. 9.]

April, 1939.

[No. 4.

---

---

### DISEASES CAUSED BY BACTERIA AND FUNGI

PETERSON, E. H., HASTINGS, E. G., & HADLEY, F. B. (1938). **The Pathology of Non-Specific Mastitis and Consideration of Possible Aetiological Agents.**—*Cornell Vet.* 28. 307-324. 8 figs., 2 tables. [Numerous refs.]

The authors quote literature references in support of the view that mastitis can exist "in the absence of streptococci or any other recognized pathogen in the milk". The present paper is concerned with the pathology of this so-called "non-specific mastitis" and possible aetiological agents. The changes, illustrated by photographs, consist of a fibrous thickening of the inter- and intralobular connective tissue, which leads to shrinking of the alveoli and degeneration of the lining epithelium. There is also an infiltration with lymphocytes, but neutrophils are few.

The authors recognize that, among the bacteria, staphylococci are the only possible causal agents. Such organisms, however, were found "only occasionally and in low counts" and, for this and other reasons, it is argued that they are not the cause. [The matter cannot be discussed at any length, but it would surely be rash to conclude that a light infection with staphylococci—organisms which are known to produce a soluble toxin—might not be responsible for the alterations in the gland. Moreover the changes do not appear to differ essentially from those which have been observed in chronic staphylococcic mastitis. The authors think that, if "non-specific mastitis" were due to staphylococci, acute clinical symptoms might sometimes be expected to develop, and this they have never seen. Actually the converse would be expected, since mild staphylococcic infections would tend to induce an antitoxic immunity.] The hypothesis is put forward that "non-specific mastitis" is due to a filtrable virus, but no definite confirmatory evidence could be obtained.—F. C. MINETT.

WILLIAMS, W. L. (1937). **The Detection of Shedders of the Streptococcus of Mastitis in Composite Control Milk Samples.**—*J. Dairy Sci.* 20. 711-717. 2 tables. [11 refs.]

Routine clinical examination of dairy cows, together with chemical tests, does

not detect all cows with mastitis streptococci. The laboratory identification of udder streptococci involves rather onerous work. Microscopic demonstration of streptococci does not always indicate mastitis, since saprophytic streptococci may be found in milk, and have been cultured from samples of milk taken aseptically. High cell counts from bulk samples are less significant than those found in individual samples.

A series of cultural tests are described which were used as a rapid routine procedure for the identification of mastitis streptococci. All bulk samples showing long-chained streptococci or having high cell contents were cultured, and if growth was obtained, individual samples were then taken.

Water used for rinsing pipettes contained 50 p.p.m. of chlorine as an antiseptic. Milk in 2 c.c. samples was inoculated into 10 c.c. of fresh sterile 1% sodium carbonate and incubated overnight at 37°C. Individual samples of milk taken aseptically were incubated in the containers. Blood agar plates were streaked and incubated at 37°C. for 24 hours. Streptococci causing any degree of haemolysis were transferred to litmus milk and incubated overnight. Pure cultures were then transferred to 1% sodium hippurate or 1% aesculin in Douglas broth, and incubated at 37°C. for 72 hours. Approximately 4 c.c. of each medium were used. About 0.2 c.c. of 1% aqueous solution of ferrous citrate is used as indicator of splitting of aesculin. Medium containing trehalose and sorbitol were used to differentiate human from animal strains.—H. E. BYWATER.

CLARK, R. (1938). **Speculations on the Incidence of Anthrax in Bovines.**—*J. S. Afr. vet. med. Ass.* 9. 5-12. 5 tables.

C. made some observations on the incidence of anthrax in bovines in the Eastern Orange Free States over a period of a few years. He puts forward the theory that most outbreaks are not due to ingestion of infected grass or water, but to chewing bones or hides of anthrax carcasses. Anthrax was more common in the summer months, but outbreaks were unrelated to rainfall incidence. The value of anthrax vaccination, in stopping mass outbreaks of the disease, was clearly demonstrated. Vaccination could not be held wholly responsible for the cessation of outbreaks on farms where carcass material was disposed of in the proper manner.

—E. M. ROBINSON.

RADOJČEVIĆ, M. (1937). Prilog poznavanju utjecaja passaza na patogenost *B. anthracis*-a. [**Effect of Animal Passage on *Bacillus anthracis***].—*Jugoslav. vet. Glasn.* 17. 449-455. 8 figs., 3 tables. [Numerous refs.] [German summary].

Three experiments were carried out in order to attenuate a fully virulent strain of *B.a.* The strain was passaged 150 times through the brains of rabbits, and 100 times through the brains of white rats, and a series of 70 sub-cultures were made on a medium containing brain substance.

After 30 of these sub-cultures there was already considerable alteration of pathogenicity for rabbits, the organisms also becoming smaller and losing their ability to form capsules, but pathogenicity was not completely lost at this point, or even after all 70 sub-cultures.

The 150 passages through rabbit brains had no influence on the pathogenicity or the morphological characters of the organisms. On the other hand, 40 passages through rat brains caused the loss of capsules, and after the 100th passage a diminution of the size of colonies was noted, as well as a lowered pathogenicity for sheep; the organism was, however, still fully pathogenic for both rabbits and rats.

—B. OSWALD (KRIŽEVCI).

WOHLFEIL, T., & WOLLENBERG, H. (1938). Ueber Fermenthemmung und -Förderung bakterieller Fermente im infizierten Tierkörper. II. Wirkung von  $\text{Cu}^{++}$ ,  $\text{Hg}^{++}$ , Monojodessigsäure,  $\text{Fe}^{++}$ , Ferroaskorbinsäure, Phosphaten und Natriumzitat auf den Ablauf der Milzbrandinfektion des Meerschweinchens und der Proteusintoxikation und -Infektion des Kaninchens. [The Inhibition and Stimulation of Bacterial Ferments in the Animal Body. II. Effect of Metallic Ions and Chemical Compounds on Anthrax in Guinea Pigs and of Proteus Intoxication and Infection on Rabbits].—*Zlb. Bakt. I.* (Orig.). 141. 159-170. 7 tables. [Numerous refs.]

The administration of moniodoacetic acid either before or after the artificial inoculation of g. pigs with virulent anthrax bacilli resulted in a slower onset of septicaemia and a longer survival period as compared with g. pigs which received no moniodoacetic acid. Treatment with copper sulphate, corrosive sublimate and novasural in non-toxic doses, produced a rather similar result. On the other hand the lethal effect of *Proteus vulgaris* is exaggerated by the administration of ferro-ammonium sulphate. From experiments of this type it is suggested that, in general, proteinase-inactivating substances tend to decrease pathogenicity, which is increased by substances which stimulate such enzymes.—E. J. PULLINGER.

RUSSEFF, C. (1937). Prüfung der Resistenz banginfizierter Meerschweinchen gegenüber einer Milzbrandsuperinfektion. [The Resistance of Brucella-Infected Guinea Pigs to Superinfection with Anthrax].—*Z. ImmunForsch.* 90. 78-80. [9 refs.]

Working with small groups of g. pigs, R. found that whilst normal g. pigs and those injected with *Br. abortus* died equally rapidly after artificial infection with anthrax, tuberculous g. pigs infected with anthrax survived for a significantly longer interval.—E. J. PULLINGER.

GORDON, Ruth E. (1937). The Classification of Acid-Fast Bacteria.—*J. Bact.* 34. 617-630. 5 figs., 2 tables. [7 refs.]

G. was able to separate 80% of 252 strains of saprophytic acid-fast bacilli, isolated from soil, plants and animal tissues, into three main groups, based on the following criteria :—

GROUP I : *Mycobacterium smegmatis* type, fails to survive 60°C. for one hour, and grows at 47°C.:— (a) utilizes arabinose : 105 strains similar in appearance and cultural reactions, and (b) unable to utilize arabinose : four strains different in appearance and cultural reactions from above cultures and from each other.

GROUP II : fails to survive 60°C. for one hour, and does not grow at 47°C. :— (a) unable to utilize sorbitol :—

(1) unable to utilize arabinose : 66 strains similar in appearance and cultural reactions, 22 strains different from the above and from each other ; and

(2) utilizes arabinose : seven dissimilar strains, and

(b) utilizes sorbitol : 18 dissimilar strains.

GROUP III : *Mycobacterium phlei* type, survives 60°C. for one hour and grows at 47°C. :— (a) utilizes arabinose : 29 strains similar in appearance and cultural reactions, and (b) unable to utilize arabinose : one strain differing in appearance and cultural reactions from the above cultures.

The original article should be consulted for further technical details.

—D. L. HUGHES.

ROBIN, V. (1938). Sur la procédure en matière de tuberculose bovine. [**Bovine TB. from the Legal Aspect**].—*Rec. Méd. vét.* 114. 343-352. [9 refs.]

A discussion on the difficulties arising from various aspects of the law relating to the control of bovine TB. and sale of affected cattle in France.

R. considers the position of buyers of animals affected with forms of TB. which are regarded in law as contagious, including advanced infection of the lungs, intestines, uterus or udder, or of animals with other forms of TB. not officially regarded as contagious. Court rulings and opinions of legal experts are quoted.

He differentiates between action for breach of warranty and for nullity of sale, and emphasizes the difficulty of diagnosis of certain forms such as tuberculous enteritis and metritis.—H. BURROW.

DOEVE, W. C. A. (1938). Het afmaken van tuberculine-reactoren. [**The Destruction of Tuberculin Reactors**].—*Ned.-ind. Bl. Diergeneesk.* 50. 45-59.

D. advises against the indiscriminate slaughter of tuberculin test reactors among cattle in the Dutch East Indies, as the test is not free from error [false positive reactors]. In his opinion clinical and bacteriological examinations should be made the basis of the removal of tuberculous animals.—JAC. JANSEN (UTRECHT).

GRAZZINI, A. (1936). Contributo allo studio delle forme anatomiche e sulla frequenza della tubercolosi nei bovini. [**Sites of Tuberculous Lesions in Cattle**].—*Profilassi.* 9. 91-92. [French and German summaries].

Cattle slaughtered in the La Spezia abattoir were examined P.M. for tuberculosis. They were divided into two classes :—(1) calves aged four months and under of which only two out of 25,581 were infected, and (2) older animals, of which just over 10% were tuberculous. Infection was more prevalent amongst stalled animals. In 87% of cases the seat of infection was pulmonary, in 2·3% it was intestinal, in 4% both respiratory and digestive organs were affected, and in 6·3% the disease was generalized.—S. F. J. HODGMAN.

DESSY, G. (1937). Expériences de vaccination antituberculeuse du bétail moyennant le vaccin de Belfanti-Dessy (atism). [**The Belfanti-Dessy Antituberculosis Vaccine for Cattle**].—*Boll. Sez. ital. Soc. int. Microbiol.* 9. 249-253. [2 refs.] [In French]. [Also appeared in *Clin. vet., Milano.* 60. 700-702].

The vaccine referred to above consists of a live culture emulsified in saponin. It is said that this product is not pathogenic to cattle when inoculated subcutaneously at the base of the tail, that the only result is the development of a local nodule and that immunity results which lasts for at least a year. Unless two or three injections of vaccine are given the tuberculin test remains negative.

During five years, 256 cattle were vaccinated; 146 were killed after exposure to infection [no details given], and only two showed any signs of TB. other than the vaccination nodule. Two vaccinated cows had been injected with virulent tubercle bacilli [no details] intravenously eight months after vaccination, no lesions were observed on slaughter six months later. Two vaccinated cows given live culture subcutaneously reacted with local abscesses only. Control cows contracted generalized TB.—P. S. WATTS.

LEGRAND, R., GERNEZ, C., CRAMPON, P., & LEFORT, E. (1938). Recherches comparatives sur les procédés d'isolement du bacille tuberculeux dans le lait de vache. [**Comparison of the Methods for the Isolation of Tubercle Bacilli from Milk**].—*C. R. Soc. Biol. Paris.* 128. 204-206. [1 ref.]

Four out of 75 samples (5·3%) of milk delivered for human consumption

direct from the farm in northern France were shown by g. pig inoculation to contain living tubercle bacilli.

Preliminary treatment of centrifuged deposit with 4% caustic soda for two hours, or with 15% sulphuric acid for half an hour, prevented infection by contaminants in over two-thirds of the g. pigs, but it reduced by half the positive results of the test.

About two-thirds of the cultures made from milk given preliminary treatment with 15% sulphuric acid for half an hour were contaminated with sporulating organisms, the isolation of tubercle bacilli then being impossible. It is suggested that formation of dense masses of coagulated casein that followed addition of the acid was partly responsible for this result. Preliminary treatment with 4% caustic soda for four hours at 37°C. of milk artificially infected with human tubercle bacilli did not inhibit subsequent growth of the bacilli.

In order to eliminate all sporulating organisms, however, this treatment would have to be continued for more than four hours and this would interfere with the demonstration of tubercle bacilli in cultures.—H. BURROW.

JOYNER, A. L., & SABIN, F. R. (1938). **Altered Cutaneous Conditions in the Skin of Tuberculous Guinea Pigs as Demonstrated with a Vital Dye.**—*J. exp. Med.* **68**. 325-334. 4 figs. on 1 plate, 2 tables. [13 refs.]

It has been shown that in tuberculous g. pigs a dye injected intradermally does not spread, whereas it does spread in uninfected g. pigs.

A number of g. pigs, in the allergic state of TB., some in a moribund condition due to the same disease, or with epizootic lymphadenitis [a streptococcal infection—see *V. B.* **7**. 542], were inoculated intradermally with 0.025 c.c. of pontamine sky blue in each of the four quadrants of the ventral side, or in two sites on the midline of the dorsal aspect. A number of controls were similarly injected.

The measurements of the areas of spread of the dye were taken at 1 hour, 4 hours, and 24 hours respectively.

In g. pigs whose skin was in an allergic condition, due to TB. or epizootic lymphadenitis, the rate of spread of the dye was much slower than normal. When the skin was hypoergic or anergic, however, as in advanced TB., a faster spread than normal occurred. It is suggested that this dye method may disclose altered tissue conditions in the allergic state.—D. D. OGILVIE.

HORSTMANN, H. (1938). Ein Beitrag zum Rotlauf bei Enten. [**Infection of Ducks with the Bacillus of Swine Erysipelas**].—*Z. InfektKr. Haustiere.* **53**. 106-112. [14 refs.]

A description of naturally occurring cases of *Erysipelothrix rhusiopathiae* infection in two ducks.—E. J. PULLINGER.

YANKOVITCH, J. (1937). La morve et les mesures de police sanitaire en Yougoslavie et en France. [**Regulations against Glanders in France and Yugoslavia**].—*Thesis, Alfort*. pp. 100. [Numerous refs.]

The history of glanders from Roman times is traced. Morphology, cultural characters and staining-reactions of *Pfeifferella mallei* are detailed and the modes of infection—chiefly by nasal route, by inoculation of abrasions on mucous membranes or skin or by ingestion of massive doses of organisms—are dealt with. There is a discussion of the species of animals which are susceptible to infection.

The pathology of the disease, including the origin and constitution of the lesions produced, is dealt with, and also differential diagnosis, both *ante-* and

*post-mortem*. Y. stresses the futility of vaccination and medicinal treatment, outlining measures for control by the free use of the mallein test, isolation and destruction of affected animals. He gives a detailed summary and critical comparison of the regulations in force for the control of glanders in France and Yugoslavia respectively.—H. BURROW.

RUSSEFF, C., & HENNINGER, E. (1937). Ueber die Züchtung von Rotzbazillen in synthetischen Nährböden. [**The Cultivation of *Pfeifferella mallei* in a Synthetic Medium**].—*Z. Immunforsch.* **90**. 81-84. 2 figs. [7 refs.]

*Pf.m.* was successfully grown for mallein production on a synthetic medium containing a balanced mixture of salts plus 10% of glycerin and 0.1% of asparagine. In this medium the organism grew ten times more copiously than in glycerin meat broth, and the resulting culture proved excellent for the manufacture of mallein.

—E. J. PULLINGER.

KUKLA, F. W. (1937). Ueber das Vorkommen von Fleischvergiftungen bei Hunden. [**Meat-Poisoning Organisms in Dogs**].—*Inaug. Diss., Hanover*. pp. 32. 7 tables. [Numerous refs.]

K. reports the examination for meat-poisoning organisms of faeces and organs of a large number of dogs with various chronic diseases. In 216 samples of faeces from 108 different dogs he found *Bacterium coli* 108 times, *Proteus vulgaris* 66 times, *Salmonella enteritidis* Gärtner once, *S. typhi-murium* once, and salmonella of an intermediate group seven times. In the organs of 25 dogs the findings were *Bact. coli* 25 times, *P. v.* 14 times, *S.e.* Gärtner three times and *S.t.-m.* once. He describes one case as a carrier, since *S.e.* Gärtner was demonstrable in its faeces over a period of about five months. The general conclusions are that dogs only become infected with meat-poisoning organisms in rare instances.—M. F. B.

HLAVÁČEK, B. (1937). Nakažlivé zmetání po infekci bac. parat. abortus equi. [**Infectious Equine Abortion**].—*Voj. zdravotn. Listy*. **13**. 320-328. 1 table. [English, French and German summaries].

A description of *Salmonella abortus-equi* infection in mares and foals in a breeding stud. Conventional prophylaxis and treatment were carried out.

—E. PŘIBYL (BRNO).

PIRIE, J. H. H. (1938). **Bacterial Encephalitis from the Genus *Listerella*: A New Disease of Man and Animals**.—*S. Afr. med. J.* **12**. 51.

In 1927, P. described an organism from an epizootic in gerbilles in the Orange Free State as *L. hepatolytica*. Subsequently he found the organism to be identical with *L. monocytogenes* described by MURRAY in England in 1926. *Listerella* infections have subsequently been described from encephalitic conditions in man and animals. Recently a *Listerella* infection has been described in fowls with necrosis of the myocardium as the most prominent lesion.—E. M. ROBINSON.

KALIKIN, B. (1937). Eksperimentalni studij mehanišma infekcije i imuniteta kod kolere peradi. [**Infection and Immunity in Fowl Cholera**].—*Jugoslov. vet. Glasn.* **17**. 428-442. 7 tables. [16 refs.] [German summary]. [See also *V. B.* **7**. 367].

K. concludes that oral infection with *Pasteurella aviseptica* can only occur when there is a lesion of the mucous membrane of the alimentary tract, that even with repeated doses of a highly virulent strain immunity cannot develop in the absence of such a lesion, that the cells which are susceptible to fowl cholera lie

beneath the intestinal mucous membrane, which must first be injured for either oral infection or immunization to take effect, that fowls may survive oral infection when such injured mucous membrane is in the stage of recovery, and that such fowls are thereafter immune. Strong immunity was obtained in fowls that were given salicylate vaccine *per os* following intestinal lesions caused by crushed glass particles mixed with the food. On account of the above observations K. strongly supports BESREDKA's theory (1928) concerning the existence of so-called receptive cells.

—B. OSWALD (KRIŽEVCI).

TRUCHE, M. (1988). La pseudo-tuberculose chez les animaux. [**Pseudo-tuberculosis in Animals**].—*Rev. Path. comp.* **38**. 874-888.

T. describes *Pasteurella pseudotuberculosis* infection of rodents and birds, occurring most commonly in the g. pig, and to a lesser extent in the rabbit, hare and cat. Of the larger animals, only sheep have been proved susceptible. A few cases have occurred in human beings. Of domestic birds, turkeys, ducklings and swans are chiefly affected. In g. pigs an acute septicæmic and a subacute type are recognized and the disease follows a similar course in rabbits and hares. In birds death usually occurs in 3-10 days following diarrhoea and emaciation. The lesions vary, but the lungs, lymph nodes or liver may be affected.

The causal organism is Gram-negative and non-sporulating. It gives a characteristic growth in broth, forming fine flakes which thicken and fall to the bottom of the tube. The cultural characters, biochemical and agglutination reactions, and results of experimental inoculation, are described, and methods of treatment discussed.—S. J. GILBERT.

MILLER, F. W., GRAVES, R. R., & FOHRMAN, M. H. (1937). **Management and Breeding Data on a Dairy Herd in which Bang's Disease (Infectious Abortion) was Eradicated by Segregation.**—*J. Dairy Sci.* **20**. 537-550. 8 tables.

This dairy herd was used for breeding and nutritional investigation by the Bureau of Dairy Industry, and had long been infected with contagious abortion. Isolation of 82 positive reactors to *Brucella abortus* was performed in 1926, leaving 65 negative reactors. 80 reactors were removed from the negative herd between 1926 and 1932, after which date no further reactors were found. Calves born in the positive group were fed on milk from that group until 60 days old, then on milk from negative cows for ten days, after which they were removed to the negative group and placed with negative calves after isolation for a further ten days. One calf remained a positive reactor until past breeding age. The same bulls were used for both herds, using neutral ground. The abortion-positive cows required more services per conception when bred after an abortion than when bred after a normal calving.—S. J. GILBERT.

I. ALEKSA, K. (1988). **Bovine Tuberculosis and Brucellosis in Lithuania. Bovine Tuberculosis.**—*Mon. Bull. agric. Sci.* **29**. 1T-4T. 2 tables.

II. PABIJANSKAS, A. (1988). **Bovine Tuberculosis and Brucellosis in Lithuania. Brucellosis and Its Control.**—*Ibid.* 4T-6T.

I. Only a small proportion of the herds in Lithuania comply with the control measures for TB., which are optional except in cases of mammary TB. Since 1980, when the present control scheme was begun, the number of herds examined has increased from 123 to 1,520, and the number of positive reactors has decreased from 11% to 8%. The number of cases of open TB. decreased from 2.3% in 1980 to 0.5% in 1986, and this drop made it possible to employ the slaughter policy for these cases. Positive reactors are slaughtered only with the owner's

consent. Under the present system the fees levied on animals slaughtered at abattoirs go to a special fund, and out of this indemnities are paid to owners for the cattle slaughtered. Indemnities are also paid for infected meat and milk confiscated at inspection, but only if the owner complies with the control regulations.

II. *Brucella* infection has increased in Lithuania with the stimulus given to stock-breeding; the number of infected herds has increased from 9 in 1982 to 227 in 1987. P. gives details of control measures. Every case must be declared; the herd is then tested, and infected cattle are segregated; they can only be sold for slaughter. If an owner consents to have all positive reactors slaughtered, he receives an indemnity of 50% of the value of the meat. Milk from infected herds can only be supplied to dairies where milk is heated to 85°C. for one minute, or to 65°C. for half an hour. Imported cattle have to have a certificate from the country of origin stating that they were examined shortly before sale and that the blood test was negative; in addition they are re-tested at the frontier, and quarantined until the result is known.

ITABASHI, K., ITO, S., WATANABE, S., TAJIMA, Y., & HARAKO, K. (1938). **Studies on Contagious Abortion in Cattle. I. Epizootiological Observations on *Brucella* Abortion among Cows at the Yamuyingzu Stock Farm near Wangyehmlao, Inner Mongolia, Manchoukuo.**—*J. Jap. Soc. vet. Sci.* 17. pp. 66-77 of pt. 1. 11 tables. [4 refs.] [In Japanese: abstr. from English summary pp. 8-10 of pt. 2].

Blood agglutination tests carried out in May and June, 1936, yielded 19.8% and 42.1% of reactors to *Br. abortus*. After subsidence of the infection there was sterility in 24% of the herd. No difference was noted in the incidence of abortion among animals vaccinated with lanolin-live vaccine, lanolin-dead vaccine, or ordinary dead vaccine.

Abortions occurred with the same frequency among both positive and negative reactors, but sterility was more marked among the former.

It is stated that agglutinins were absent from the blood of infected cows so long as they remained sterile. It was concluded that infected bulls played no part in the spread of the disease.

It was noted that some infected cows repeatedly aborted.—H. BURROW.

GARDINAZZI, L. (1936). Contributi alla casistica dell'infezione spontanea da *Brucella Abortus* nel cavallo. [*Br.a. Infection in Horses*].—*Clin. vet., Milano*. 59. 52-59. [20 refs.]

G. describes three cases which he treated. In a mare which developed "ulceration" in the left udder one month after her foal was weaned, microscopic examination of pus revealed a brucella-like organism [no cultures grown], and agglutination and c.-f. tests with the mare's blood were positive for *Br.a.* Two of three g. pigs inoculated with pus also reacted serologically and developed lesions of brucellosis. The sole possible source of infection was considered to be water which had passed over an infected area, and which the mare drank. The other two cases treated were of horses with swellings on the withers.

G. concludes that horses can contract infection and develop lesions in parts of the country where infection is not present amongst the cattle [no evidence produced].—S. F. J. HODGMAN.

TARASOV, I. (1937). Vospriimčivostj svineik brucellezu tipa *melitensis*. [**Susceptibility of Swine to *Brucella melitensis***].—*Brucellosis in Sheep*. pp. 408-406. 1 table. Moscow: Viem Publ. Dept.

Agglutination tests failed to demonstrate brucella infection in any of the pigs

on a farm in North Caucasus on which sheep brucellosis was prevalent. *Br.m.* was recovered, however, from the carcass of a five-day-old piglet which had died in a herd in which there had been cases of abortion. Six pigs 4-6 months old were inoculated subcutaneously with large doses of *Br.m.*; the organisms were found generalized throughout the internal organs of an animal inoculated with  $5 \times 10^9$  bacteria, while in another given  $10^6$  bacteria infection was localized; the remaining four animals did not become infected. These findings are considered to indicate that, although swine are naturally resistant to *Br.m.*, in exceptional cases they may become infected. S. considers that the matter requires further investigation.

LAFENÊTRE, H., & ROMAN, G. (1937). L'orchite-épididymite brucellique. [**Orchitis and Epididymitis Caused by Brucella Infection**].—*Rev. Méd. vét., Toulouse*. **89**. 700-706. [Numerous refs.]

The different types of brucella tend in males to become localized in the genital organs. One experimental and one clinical case are described in rams. A ram was infected by the application of *Br. melitensis* to a scarified area on the surface of the scrotum. When it was slaughtered 18 months later, an abscess of the prostate was observed, the size of a large orange, and *Br.m.* was recovered by culture and g. pig inoculation. In the second case which occurred in an infected flock, an induration of the left epididymis was observed in a three-year-old ram. On P.M. examination a series of small grape-like abscesses containing thick yellow pus were found, and yielded pure cultures of *Br.m.*

The authors draw attention to the possibility of infection being transmitted by rams infected in the genital organs.—S. J. GILBERT.

- I. PALTRINIERI, S., & GHINELLI, I. (1937). Ricerche sulla trasmissione sperimentale della brucellosi negli ovini per la via endorachidea. [**Artificial Infection of Sheep with Brucella via the Spinal Canal**].—*Nuova Vet.* **15**. 35-41. 1 fig., 2 graphs.
- II. BETTINI, U. (1937). L'importanza delle vaccinazioni per la difesa contro l'aborto epizootico e per i casi di sterilità ad esso legati.—[**Value of Dead Vaccine against Brucellosis and Sterility Associated with Brucellosis**].—*Ibid.* 257-260.
- III. TIRAFERRI, E. (1937). Sul potere battericida in vitro del sangue in toto sulla *Brucella melitensis*, sulla *Br. paramelitensis* e sulla *Br. abortus*. [**Bactericidal Power of Whole Blood for Brucella in vitro**].—*G. Batt. Imm.* **19**. 9-16. 4 tables. [English, French, German and Spanish summaries].

I. The authors review at length experiments by various workers on the methods of infection of sheep with brucella, concluding that infection *via* the skin, after it has been shaved or scarified, or *via* mucous membrane, is more common than infection *via* the alimentary tract. They note that no experiments have so far been done on infection *via* the epidural space, and describe the results of two such inoculations on two animals in the sacral region. Paralysis in the quarters accompanied by a rise of temperature occurred. On a further injection subdurally into the atlanto-occipital space, both animals died with symptoms of acute meningitis.

II. B. reports a series of experiments carried out during the period 1930-1935 in the Province of Bologna and Ferrara. He claims to have established :—(1) the importance of brucellosis as a factor in sterility of cows; (2) the value of dead vaccine, prepared according to the method of LANFRANCHI, in overcoming both abortion and sterility, and (3) that injection of the vaccine into the caudal fold

is more effective than into the neck, since in a single series of experiments abortion was reduced to 25% by the latter and to 1% by the former.

III. T. states that the best experimental conditions for demonstrating the bactericidal power of the blood of man and animals to the *Brucella* species are produced by contact of the blood with the organisms at 37°C. for 5-6 hours. The differences between the bactericidal power of the blood of man and that of animals' blood is small. In various samples a difference is found between the effects on *Br.m.* and the *Br.a.*, but the differences are small, follow no fixed rule, and vary. *Br. paramelitensis* is almost constantly less resistant than *Br.m.* or *Br.a.*

—S. F. J. HODGMAN.

KOTLJAROVA, N., & VERŠILOVA, P. (1937). Opyt sanacii brucelleznogo stada ovec putem serologičeskogo othora životnyh. [**Attempt to Control Brucella Infection in Flocks of Infected Sheep, by Separating the Healthy from Infected Animals by Serological Tests**].—*Brucellosis in Sheep*. pp. 383-386. 1 table. Moscow: Viem Publ. Dept.

In June, 1933, an attempt was made to separate the brucella-infected sheep flocks on one of the sections of the Experimental Sheep Farm in North Caucasus into three distinct groups according to their response to the agglutination test; each animal was tested twice consecutively, the results being further checked by an additional test with melitin. The negatively reacting group (543 head) was similarly tested in October of the same year, and was kept on separate pastures, strictly isolated from the rest of the flocks. A second group (851 head) consisted of "doubtful" reactors. The remainder were grouped as infected and were not subjected to further examination.

During the following spring, 79 of the ewes in the negative group aborted, and on bacteriological examination only two of their 90 dead foetuses (2.4%) were found to be brucella-infected. Most of the remaining foetuses yielded cultures of a Gram-negative, polymorphous rod, and it was considered that the organism had spread in the flock and caused the abortions. It could not be identified, however, because the cultures died out.

These results, while admittedly preliminary, are considered to demonstrate the possibility of segregating brucella-free animals from infected flocks by serological or allergic tests, since the percentage of abortions due to brucella was reduced to 2.4 from between 37 and 48 in the infected group. During the same spring there were also 48% of abortions due to brucella in the group which gave "doubtful" reactions to melitin, demonstrating that agglutination reactions of 1:10 or 1:20 cannot be ignored. It is claimed that allergic tests were more reliable than agglutination tests.

TARASOV, I., & VERŠILOVA, P. (1937). Opyt sanacii brucelloznogo ovcevodčeskogo hozjaistva putem vydelenija otricateljno reagirujuščih životnyh allergičeskim metodom. [**An Experiment to Control Brucella Infection in Sheep Flocks by Isolating Animals with a Negative Reaction to the Allergic Test**].—*Brucellosis in Sheep*. pp. 387-398. 3 tables. Moscow: Viem Publ. Dept.

In the spring of 1935, an experiment was begun on the North Caucasus Experimental Sheep Farm, to reconstitute a healthy flock from a total of about 13,000 fine-fleeced sheep, in which serological (agglutination) and allergic ("brucellysate") tests revealed a 68% brucella infection among the adult animals, 28% among the yearlings, and 14% among the lambs between six and seven months old. All the animals were first tested with "brucellysate" (0.5 c.c. for each adult and 0.4 c.c. for each younger animal, injected into the caudal fold), and

negative reactors were retested twice, one and five months later. The 5,732 sheep thus isolated were moved to a freshly established farm 22 km. away, and every precaution was taken to keep them from contact with infected personnel, cattle, and dogs (all of which were tested with "brucellysate"). Before admittance to the farm the sheep were shorn and passed through a disinfectant dip.

Of a total of 1,180 yearling ewes artificially inseminated on the new farm, only 0.25% aborted, and only 1.3% produced dead or non-viable lambs; bacteriological examination of the aborted foetuses or dead lambs and of their dams failed to reveal a single case of brucella infection. In the infected flocks, on the other hand, 4% of the 5,645 ewes in lamb aborted, and a further 4% produced dead or non-viable lambs, brucella infection being established in 59% of the abortion cases.

COTRUFO, P. (1937). Immunizzazione attiva sperimentale per via endovenosa con vari tipi di vaccini brucellari (vaccino lisato, vaccino formolato, vaccino fenicato). Contributo allo studio della vaccinoterapie endovenosa della setticemia di Bruce. [**Intravenous Vaccination against Brucellosis**].—*G. Batt. Immun.* **19**. 577-592. 1 table. [Numerous refs.] [English, French and German summaries].

C. experimented on immunization of animals with mixed brucella vaccines (*melitensis*, *paramelitensis*, and *abortus*) preparing the vaccines as follows:— (1) with phenol, (2) with formaldehyde, and (3) by a hydrolytic process and mixing with formaldehyde. The immunological reactions (phagocytic, bactericidal, agglutinating, and complement-fixing), and also general reactions shown by the test animals, convinced him that vaccine treated with formaldehyde had a decided advantage over that treated with phenol. The hydrolysed vaccine had good immunizing properties, but did not cause production of agglutinins. It possessed the advantage of being absolutely atoxic.—S. F. J. HODGMAN.

VOSKRESENSKIĬ, B., VERŠILOVA, P., & ŠTRITER, V. (1937). Opyty po immunizacii ovec protiv brucelleza ubitymi i oslablennymi kulturami brucell. [**Experiments on Immunization of Sheep against Brucellosis by Killed and Attenuated Cultures**].—*Brucellosis in Sheep*. pp. 367-376. 5 tables. [9 refs.] Moscow: Viem Publ. Dept.

No increased resistance in sheep to experimental brucella infection was obtained by vaccinating them subcutaneously with heat- or formalin-killed cultures of various strains of brucella. Attempts to immunize the sheep with massive doses of living culture of Dubois's strain of non-virulent *Br. suis* or with attenuated *Br. melitensis* cultures also failed to give results of any practical significance.

VERŠILOVA, P. A. (1937). Vydelenie brucell s molokom, močoj i vaginalnym sekretom u estestvebbo i eksperimentaljno zaražennyh ovec. [**The Excretion of Brucella in Milk, Urine and Vaginal Secretion Under Conditions of Natural and Experimental Infection of Sheep**].—*Brucellosis in Sheep*. pp. 95-105. 2 tables. Moscow: Viem Publ. Dept.

Milk, urine and vaginal secretion of 49 ewes naturally or artificially infected with *Br. melitensis* were tested for the presence of brucella, 5-100 days after parturition. Tests were made either by direct sowings on gentian violet-liver agar, or by injections into g. pigs and rabbits, which were then subjected to agglutination tests or to allergic tests with melitin, and finally killed and examined bacteriologically. While brucella cultures were obtained in only 8% of all the sowings made from the secretions or from the organs of the test animals, the aggl. and allergic tests were positive in

26 %, 27 % and 22 % of the injections made with milk, urine, and vaginal secretion respectively, and V. suggests that the latter test is much more reliable. He also found that the excretion of brucella in milk, urine, or vaginal secretion was relatively "scanty", for which reason the organism is not easily recovered by direct sowings. Excretion in the milk is further stated to take place most frequently and regularly during the first few days of lactation; in the urine it occurs during the initial period of infection or at times when latent or chronic infection is exacerbated; in the vaginal secretion it occurs during the first few days after abortion. The longest periods during which excretion of brucella was noted were:— in milk, 10 days from the beginning of lactation; in urine, 60 days after abortion, and in the vaginal secretion, 90 days after abortion. It is pointed out, however, that the excretion may occasionally last for much longer periods.

MATVEEV, S. (1937). Epidemiologija brucelleza v Krymu. [**An Epidemiological Study of Brucellosis in the Crimea**].—*Brucellosis in Sheep*. pp. 445-455. 5 tables. [16 refs.] Moscow: Viem Publ. Dept.

Investigations in the Crimea showed *Br. abortus* infection to be sporadic among persons having direct contact with cattle. *Br. melitensis* infection, on the other hand, was fairly prevalent both in the country and the towns, in the former from direct contact, and in the latter chiefly owing to the wide-spread consumption of fresh "brynza", a cheese prepared from unpasteurized sheep-milk, from brucella-infected flocks. Until the installation of properly equipped cheese factories, where the milk can be pasteurized, M. recommends that the cheese should not be sold for at least 60 days after salting.

TARASOV, I. (1937). Aktivacija brucelleza u ovec pod vlijaniem ospy. [**Activation of Brucellosis in Sheep under the Influence of Sheep Pox**].—*Brucellosis in Sheep*. pp. 377-381. 2 tables. Moscow: Viem Publ. Dept.

During the summer and early autumn of 1935, a severe outbreak of an atypical form of sheep pox occurred among the experimental sheep flocks of the Brucellosis Commission in North Caucasus. Severe complications were encountered (poly-arthritis of the limbs, tendo-vaginitis, orchitis, peripheral paresis, etc.) which do not usually occur in sheep pox, but are commonly observed in sheep immediately after brucella abortion. Arthritis cases, in particular, occurred in 50-60 % of the infected animals. On bacteriological examination of slaughtered sheep, brucella were recoverable from the internal organs of animals which had been infected with brucellosis for 5-20 months. From these observations T. is convinced that latent brucella infection in the sheep was activated under the influence of superinfection with sheep pox.

TARASOV, I. Eksperimentaljnoe zaraženie ovec brucellezom čerez kožnye i elizistyje pokrovy. [**Experimental Brucella Infection through the Mucous Membranes and the Skin**].—*Brucellosis in Sheep*. pp. 45-67. 4 tables, 2 appendixes. Moscow: Viem Publ. Dept.

T. confirmed the high susceptibility of sheep to infection with *Br. melitensis*, using a highly virulent strain originally isolated from a human being and passaged through sheep. The tests were made on 31 healthy sheep, chiefly merinos, imported to the North Caucasus Experimental Farm from brucella-free regions.

The minimum infective doses were  $2 \times 10^9$  organisms given *per os*,  $5 \times 10^8$  instilled in the eye, and  $10^9$  introduced with a gauze plug into the vagina, in direct contact with the os uteri. Further experiments showed that infection might also take place through the slightly scarified skin (of the groin), but doses of less than

from  $2 \times 10^7$  to  $10^8$  organisms were ineffective. When the organisms were mixed to a thick paste with sheep faeces and maintained in contact with the skin for prolonged periods of time (24-48 hours) massive doses from  $5 \times 10^{10}$  to  $10^{11}$  were necessary to set up infection. Five healthy sheep were kept in daily contact with infected animals from May to August (during which time no cases of abortion occurred among the infected sheep), and all remained healthy.

The results of special tests are claimed to have established that bacteraemia does not necessarily accompany *Br.m.* infection through the mucous membranes or the skin; in T's tests it occurred in only 20% of the cases, and that only during the acute stage (15-35 days after infection). As a rule, the agglutination reaction (with titres of 1:40 and higher) appeared 10-80 days after infection, but occasionally not for 45-50 days. The agglutination curve attained its maximum peak (95.2%) towards the 30th day, falling off again after the 35th day. In general, the agglutination reaction varied in its intensity, fluctuations, and constancy from one animal to another, and was of small reliability for diagnostic purposes. The same was also true of the complement-fixation tests, the results of which, moreover, did not always concur with those of the aggl. tests.

Intradermal tests with "brucellysate", on the other hand, are claimed to have proved most reliable in diagnosis, giving clear, specific reactions in all the experimentally infected sheep during the first two months following infection. After 2-4 months, in a small percentage of the animals (not over 13%) the reactions were often doubtful, especially after two or more tests, this may possibly have been due in part at least, to desensitization.

ŠTRITER, V. (1937). Vospriimčivostj jagnjat k brucelleza i ih imunizacije živyni kuljturam brucell. [The Susceptibility of Lambs to Brucellosis, and their Immunization by Living Brucella Cultures].—*Brucellosis in Sheep*. pp. 351-365. 4 tables. [7 refs.] Moscow: Viem Publ. Dept.

Š. describes experiments at the North Caucasus Experimental Sheep Farm, in which 40 lambs, 7-120 days old were inoculated subcutaneously, through slight scarifications of the skin, or perorally, with massive doses ( $10^6$  to  $4 \times 10^8$  bacteria) of cultures of a virulent strain of *Br. melitensis*. Since it had been shown in preliminary experiments that neither haemoculture nor the agglutination test was entirely reliable in determining brucella infection in young lambs, all the experimental animals were slaughtered 15 days after inoculation, and their internal organs studied bacteriologically. Brucella could not be recovered from the organs of 13 of the lambs tested; generalized infection was found in two cases, and in the remainder there was only localized infection, i.e., of the lymph nodes nearest the point of inoculation. It is considered, therefore, that while lambs possess a higher degree of resistance to brucella infection than do adult sheep, this resistance is only relative, since it obviously decreased with the advancing age of the lambs, and generalized infection was established even in the youngest test animal by the administration of massive doses.

In further experiments an attempt was made to immunize 12- to 35-day-old lambs by subcutaneous injections of large doses of living cultures of a non-virulent or a slightly virulent strain of *Br.m.* The results were unsatisfactory in that the increase in natural resistance so obtained was only slight and very inconstant. From a practical standpoint, Š. believes that, although young lambs are naturally more resistant than adult animals, the building-up of healthy flocks cannot be effected by the use of lambs removed between the ages of three and five months; before being selected for this purpose, each individual lamb should be tested for infection by the allergic test with "brucellysate" [see V. B. 9. 96].

PERVUŠIN, B. (1937). O metodah laboratorihoj diagnostiki brucelleza ul čoveka. [**On the Diagnosis of Brucellosis in Man by Laboratory Methods**].—*Brucellosis in Sheep*. pp. 303-338. 11 tables, 6 graphs. [Numerous refs.] Moscow: Viem Publ. Dept.

P. gives a detailed account of the results obtained by the North Caucasus Brucellosis Commission in the investigation from 1931 to 1935 of various laboratory methods for diagnosing human brucellosis. The infection was prevalent among the farm hands and other persons coming into contact with brucella-infected sheep on the Experimental Farm. The most reliable diagnostic methods were the agglutination together with allergic (melitin) tests, since in certain cases a patient might react positively to the one and negatively to the other; care must be taken in choosing the correct brucella strain in preparing the antigen for the aggl. test.

The preparation of blood cultures is discussed and the use of large amounts for seed material counselled.

TARASOV, I. (1937). Vospriimčivostj suslikov k brucellezu tipa melitensis. [**Susceptibility of Susliks to *Br.m.***].—*Brucellosis in Sheep*. pp. 339-402. 1 table. Moscow: Viem Publ. Dept.

T. gives details of experiments which demonstrated the high susceptibility of the suslik (Siberian marmot) to experimental infection with *Br.m.*, both by subcutaneous injection and through the scarified skin. A month after infection, brucella were recovered from various internal organs of the animals, especially from the spleen, lymph nodes, and bone-marrow; the organisms were also demonstrated in the urine. The high susceptibility of this rodent, coupled with the fact that it reacts very readily both to the agglutination and to the allergic tests, renders it a useful laboratory animal for the demonstration of brucella infection. The possibility that the suslik might carry and distribute the infection among sheep and cattle in steppe regions, where it is very common, was supported by the finding of numerous naturally infected individuals in the region of the Experimental Sheep Farm in North Caucasus.

GRIEDER, H. (1937). Abortus Bang in Silberfuchsfarmen? [**Brucellosis on Silver Fox Farms**].—*Schweiz. Pelzger.* 5. 357-359.

G. refers to *Br. abortus* infection in dogs, and suggests that it may also be the cause of abortion and sterility on fox farms.—D. SLAVIN.

DI AICHELBURG, U. (1934). Agglutination aspecificque avec la fuchsine basique dans les microbes du groupe Brucella. [**Non-Specific Agglutination of *Br. paramelitensis* with Basic Fuchsin**].—*Boll. Sez. ital. Soc. int. Microbiol.* 6. 30-32. [In French].

A. found that when equal amounts (0.5 c.c.) of a suspension of brucella in distilled water and of a 1:1,000 aqueous solution of basic fuchsin were mixed and incubated at 37°C., *Br.p.* was agglutinated within two hours, whilst *melitensis* and *abortus* were not agglutinated.

He recommends this as an additional differential test for *Br. paramelitensis*.  
—J. E.

MASON, J. H., STEYN, H. P., & BISSCHOP, J. H. R. (1938). **The Immunization of Bovines against Lamsiekte**.—*J. S. Afr. vet. med. Ass.* 9. 65-70. 8 tables. [2 refs.]

The experiments described in this article were carried out on some control cattle, during experimental work on the administration of phosphatic supplements

to cattle in the study of their influence on growth, reproduction, etc. As two types of *Clostridium botulinum* were known to occur on the farm, formol toxoids were made from both in horse flesh broth with meat particles and 2% horse serum. Incubation was carried out for seven days, followed by detoxication with 0.5% formalin until 0.25 c.c. was non-toxic for mice subcutaneously. Cattle received three doses of D toxoid and two of C at intervals of three weeks, the dose in each case being 10 c.c. (subcut.). No deaths occurred in these inoculated control animals, and judging by the antitoxin content of their sera, a satisfactory level was maintained. The immunity could be maintained by an annual inoculation of 10 c.c. of each toxoid.—E. M. ROBINSON.

STERNE, M., & MASON, J. H. (1938). **The Immunization of Guinea-Pigs against the Toxins of *Cl. Botulinum*, Types C and D.**—*J. S. Afr. vet. med. Ass.* **9**, 71-78. 4 tables. [2 refs.]

G. pigs were immunized against the toxins of the *Cl.b.* Types C and D by the use of formol toxoids. It was shown that with either toxoid several injections were necessary to immunize against one M.L.D. of the heterologous toxin. This supports previous experimental work [*V.B.* **6**, 582.] showing that there is a slight antigenic relationship between the toxins of the C and D types.—E. M. R.

MASON, J. H. (1936). **The Toxin of *Clostridium Chauvoei*.**—*Onderstepoort J. vet. Sci.* **7**, 438-482. 1 fig. on 1 plate, 18 tables. [Numerous refs.]

A toxin was demonstrated in filtrates of meat broth cultures of *Cl.c.* The most potent product was obtained when:—(1) the inoculum was a g. pig-passaged culture of the organism, (2) the medium (meat broth particle horse flesh broth) contained serum, haemolysed red cells and/or liver extract, and (3) the filtrate was precipitated with ammonium sulphate, with dialysis of the precipitate and drying of the resultant product. The best method of proving the presence of the toxin was the intradermal injection of g. pigs, particularly if adrenalin was incorporated in the toxin. In addition, the toxin was lethal, on intravenous injection, for the g. pig, mouse and sheep. A weak haemolysin was demonstrated, but was not proved to be the same, serologically, as the toxin.

The toxin was specifically neutralizable by antitoxin prepared in goats, sheep and g. pigs with the use of culture filtrates. In addition *Cl. septique* antitoxin neutralized it, but *Cl.c.* antitoxin had no effect on *Cl.s.* toxin.

A correlation existed between the total anti-toxin-binding value of a *Cl.c.* formol-filtrate (toxoid), the antitoxin stimulated into formation in an animal into which it was injected, and the resistance of the animal to the intradermal or intravenous injection of toxin. No correlation was shown, however, between the binding power of a toxoid, the antitoxin produced and the resistance to culture. Washed, boiled bacilli, and, to some extent, heated toxoid with no demonstrable toxin, did not stimulate the formation of antitoxin; the immunized animals did not resist toxin intradermally or intravenously, and yet were highly immune to the inoculation of culture.

The results tended to show that the heat-stable antigen was of more importance in the production of immunity to *Cl.c.* culture than the heat-labile toxin or toxoid.

I. MARINOVIĆ, O. (1937). Smiju li enormna apoplektička ugibanja ovaca diljem države ostati i dalje etiološki neobjašnjena? Početno istraživanje parašustavca ovaca u Jugoslaviji. [**Bradsot in Sheep in Yugoslavia**].—*Jugoslav. vet. Glasn.* **17**, 355-361. 2 tables. [German summary].

II. HUPBAUER, A. (1937). Parašustavac (bradsot) kod ovaca u Jugoslaviji. [**Bradsot in Yugoslavia**].—*Vet. Arhiv.* **7**. 578-580. 2 figs., 1 table. [11 refs.] [German summary].

I. M. made a clinical investigation of deaths of sheep occurring in spring on the Dalmatian isle of Pag, Yugoslavia, the symptoms observed being sudden tympany, nervous disorder, profuse diarrhoea, dyspnoea, and death. Autopsy revealed distension of the stomachs and intestine, hyperaemia of the mesentery, enlargement of the liver with haemorrhagic infarcts, haemorrhages in the kidneys, subcapsular petechiae of the spleen, oedema of the lungs, petechiae on the pleura, and enlargement of the lymph nodes. M. suggested that bradsot might be the cause of the deaths.

II. H. made a bacteriological investigation of the above cases and isolated the bradsot bacillus, this being the first time that bradsot has been diagnosed in Yugoslavia.—B. OSWALD (KRIŽEVCI).

JANSEN, J. (1938). Over verwantschap tusschen boutvuur en paraboutvuur. [**The Relationships between Blackleg and Malignant Oedema**].—*Tijdschr. Diergeneesk.* **65**. 3-7. 3 graphs. [5 refs.] [English, French and German summaries].

Sixteen g. pigs vaccinated with formolized blackleg vaccine remained healthy when infected with a culture of *Clostridium chauveoi*, but they succumbed when infected with a culture of *Cl. septicum*. In a second and third experiment on 47 guinea pigs immunized against *Cl.c.*, 46 died after infection with *Cl.s.*

—JAC. JANSEN (UTRECHT).

POZERSKI, E., & GUÉLIN, A. (1938). Contribution à l'étude des filtrats de quelques microbes anaérobies. Gélatinase et pouvoir escarrifiant. [**Filtrates of Some Anaerobic Bacteria. Gelatin Liquefaction and Scab-Forming Power in Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **128**. 842-844. [1 ref.]

Thirteen strains of *Clostridium* species were classified into four groups by the amount of gelatinase in filtrates of anaerobic glucose broth cultures, as follows:—(1) Large: *Cl. histolyticum*, *Cl. sordellii*, *Cl. welchii*, *Cl. sporogenes* (bovine strain) and *Cl. sporogenes* (P.C.). (2) Small: *Cl. septicum*, *Cl. welchii* (type D), and *Cl. bifermentans* (bovine strain). (3) Very small: *Cl. welchii* (type B), and *Cl. bifermentans* H. (4) None: *Cl. welchii* (type C), *Cl. oedematiens* and *Cl. aerofaetidis*. Scab-forming power was tested by injecting 1 c.c. of each filtrate subcutaneously into the shaved abdomen of g. pigs, and could not be correlated with gelatinase production.—R. O. MUIR.

MONNIER, & LEBASQUE. (1938). Les résultats de la vaccination du cheval contre le tétanos dans l'armée par l'anatoxine de Ramon. [**Vaccination of Army Horses against Tetanus with Ramon's Anatoxin**].—*Bull. Acad. vét. Fr.* **11**. 461-466. [2 refs.] [Also appeared in *Rev. Immunol.* **4**. 405-410].

The authors record the results obtained following the inoculation of army horses with Ramon's anatoxin. In 1929, 34,000 horses and mules were inoculated with two injections, at one month's interval, of 10 c.c. of anatoxin. Seven cases of tetanus occurred in two years, with four deaths, as against a previous annual occurrence of some 15 cases, with a higher percentage mortality, in the areas where the inoculations were performed. In 1931, a third injection was given in certain areas, and of 22,000 horses and mules vaccinated one case (non-fatal) was recorded as against a previous average annual occurrence of 0.45 per 1,000.

—S. J. GILBERT.

WOHLFEIL, T., & WOLLENBERG, H. (1987). Die Bedeutung der Bakterienurease für die Differentialdiagnose und Typenbestimmung pathogener Bakterien. [The Importance of Bacterial Urease for the Differentiation of Pathogenic Bacteria].—*Zlb. Bakt. I. (Orig.)*. 140. 281-288. 6 tables. [8 refs.]

The description of a new technique for detecting the presence of urea-splitting enzymes in bacteria. It is stressed that cultures should be tested for this urease immediately after isolation. It is reported that all species of *Brucella* were positive for urease; tubercle bacilli and *Clostridium* were negative; *Pasteurella septica* and *Past. pseudotuberculosis* were variable, but *Bacterium tularense* was negative; staphylococci were variable. Observations are recorded which suggest that staphylococci containing urease generally produce chronic infections.—E. J. PULLINGER.

ANON. (1988). Streptothricose cutanée. [Cutaneous Streptothricosis].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 3. 65.

In the Belgian Congo the best treatment for cutaneous streptothricosis is considered to be the application of 10% phenol ointment. Bathing with a lotion consisting of 3 g. picric acid and 3 g. copper sulphate to one litre water has also been found useful as a control measure.

MALFROY. (1988). La streptothricose cutanée chez les bovins de l'office du Niger. [Cutaneous Streptothricosis in Bovines in the Niger Colony].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 3. 15-16. [1 ref.]

Skin affections of animals are common in French West Africa, especially in the winter. Streptothricosis is a frequent cause of skin disease in cattle; commencing usually at the withers, it may spread over all the body and cause serious losses by injury to the hides, or by illness and death of affected animals. It is stated that in the last few years these losses have greatly decreased following the use of a cheap and effective treatment [described in the previous abstract]. Treatment should be begun at an early stage of the disease.—S. J. GILBERT.

## DISEASES CAUSED BY PROTOZOAN PARASITES

PARKIN, B. S. (1987). Auto-Sterilization in Trypanosomiasis.—*Onderstepoort J. vet. Sci.* 10. 21-27. 2 tables. [7 refs.]

This is a record of the occurrence of auto-sterilization in a number of sheep and cattle with *Tryp. congolense* and *Tryp. vivax* infections, together with an account of the methods employed to determine whether sterilization had taken place or not. No cases of auto-sterilization were observed in *Tryp. brucei* or *Tryp. equiperdum* infections of equines. In *Tryp. congolense* infections, some of the animals concerned showed the presence of the parasites for considerable periods of time before the animal body obtained the upper hand and the animals thus became sterilized.

VAN HOOFF, L., HENRARD, C., & PEEL, E. (1988). The Stability of Bayer 205 Resistance in *Trypanosoma gambiense*.—*Trans. R. Soc. trop. Med. Hyg.* 32. 197-208. [3 refs.]

Drug-resistance of *Tryp. gambiense* to Bayer 205 is an unstable character which progressively decreases on mechanical passage through mammals of the same species, decreases still more rapidly on mechanical passage through mammals of different species and even completely disappears on cyclical transmission through *Glossina palpalis*. In the epidemiology of Gambian sleeping-sickness, resistance

to Bayer 205 is of considerably less importance than the corresponding arsenic resistance.—J. M. ROBSON.

CORSON, J. F. (1987). **A Note on the Infectivity to Man of a Strain of *Trypanosoma rhodesiense* Maintained in Sheep.**—*J. trop. Med. (Hyg.)*. **40**. 141-142. [1 ref.]

CORSON, J. F. (1987). **A Second Note on the Infectivity to Man of a Strain of *Trypanosoma rhodesiense*: Resistance of Two African Volunteers to Infection.**—*Ibid.* 263-266. [7 refs.]

CORSON, J. F. (1988). **A Third Note on the Infectivity to Man of a Strain of *Trypanosoma rhodesiense*: Two Further Passages through Antelopes and Tests on Volunteers.**—*Ibid.* **41**. 125-128. [10 refs.]

These papers give C's observations on a strain of *Tryp. rhodesiense* transmitted by *Glossina morsitans* from man to sheep in 1984, maintained in sheep by fly passages for two years, and finally retransmitted to man in 1986 and 1987 (as described below). Two experiments on four volunteers were made, in each of which a single *G.m.* failed to infect one volunteer and afterwards infected another. There was no indication in control animals of loss of virulence of the trypanosome during the three years.

It is suggested that many people are bitten by infected flies without becoming infected, that cases in which infection is not apparent may not be rare, and also that some people may recover spontaneously. All the experimental transmissions were made with *G.m.*, and their main interest is that they demonstrate the persistence of infectivity for man in some of these trypanosome strains over a period of more than three years, after many cyclical passages through ruminant animals which may become infected under natural conditions and spread the disease. In all 18 experimental infections in man, the syringe being used in four, there was a definite swelling at the site of inoculation, whether this was by tsetse fly or the syringe needle; this contrasts with DUKE's observation [*V. B.* **5**. 705.], where 12 out of 17 infected volunteers showed no local reaction. No local reaction was noted when infection failed after a tsetse fly bite. C. emphasizes the importance DUKE [*V. B.* **4**. 792.] attached to the use of tsetse flies in preference to the syringe in transmission experiments.—J. A. GRIFFITHS.

DEBONERA, G. (1988). La dourine en Grèce. [**Dourine in Greece**].—*Rec. Méd. vét.* **114**. 459-468.

There is little doubt that dourine has long existed in Greece as well as in neighbouring countries, but was recently seriously investigated when it occurred in Thessaly in 1985. In this area more than 300 clinical cases were examined, and in 72% of them the organisms were demonstrated microscopically. In 1987, an area of infection was found in the plain of Salonica, and of 2,350 complement-fixation tests, 504 proved positive, including material from 121 animals which showed clinical symptoms.

About 16,000 c.-f. tests have been completed at the Athens laboratory. The trypanosome is of the European type and is difficult to convey to small laboratory animals. The symptoms observed differed from classical descriptions of the disease, being usually confined to the genital organs. Abortion and depigmentation of the skin were common. Plaques were only occasionally observed, and only five out of 300 cases could be described as severely affected. The majority of positive reactors were clinically healthy. In the c.-f. test an African strain of *Tryp. equiperdum* is used to inoculate g. pigs in preparing antigen. The g. pigs are bled by cardiac puncture and the antigen is then prepared by Watson's method. Horse

sera are inactivated at 60°C. for one hour, and donkey sera at 60°C. for one hour and 8-4 days later at 62°C. for half an hour.

Treatment with sub-toxic doses of neosalvarsan according to Ciuca's method [V. B. 4. 568.] generally effected no change in the titre of the sera of affected animals.—S. J. GILBERT.

- I. DONATIEN, A., & LESTOQUARD, F. (1938). Remarques sur l'évolution de la leishmaniose générale du chien. [**Generalized Leishmaniasis in Dogs**].—*Bull. Soc. Path. exot.* 31. 214-216. [2 refs.]
- II. DONATIEN, A., & LESTOQUARD, F. (1938). Observation d'un cas de leishmaniose générale du chien accompagnée de néoplasie. [**Generalized Leishmaniasis and Neoplasia in a Dog**].—*Ibid.* 217-220. [3 refs.] [Also appeared in *Arch. Inst. Pasteur Algér.* 16. 203-209].
- III. LESTOQUARD, F., & DONATIEN, A. (1938). Parasitisme de la matrice unguéale dans la leishmaniose générale du chien. [**Parasitism of the Claw Matrix in Dogs with Generalized Leishmaniasis**].—*Ibid.* 488-487. [See also V. B. 6. 647].
- IV. JOYEUX, C., & SAUTET, J. (1938). Observations sur la leishmaniose canine méditerranéenne. [**Canine Leishmaniasis in the Mediterranean Regions**].—*Ibid.* 487-490.
- V. PIGOURY, L. (1938). Observation prolongée d'un cas de leishmaniose du chien; remarques sur les symptômes et le traitement par l'anthiomaline. [**Observations on Canine Leishmaniasis. Treatment with Anthiomaline**].—*Rec. Méd. vét.* 114. 216-220. [8 refs.]

I. Dogs with leishmaniasis may not show clinical symptoms for over one year although they may be heavily parasitized. This latent period was most noticeable in the cold weather, but was present to some extent in all cases. The disease may be fatal, or there may be temporary or prolonged clinical recovery with liability to relapse. From observation of natural and experimental cases the authors considered that reinfection was possible. Prophylaxis should therefore include the examination of all dogs as possible reservoirs of the disease, and early detection of the latent period would greatly aid therapeutic measures.

II. The history of a case of canine leishmaniasis lasting for five months, skin lesions being the first sign. Generalized adenitis with gross enlargement of the lymph nodes was a marked feature from the start and the size of the lymph nodes fluctuated in the course of the infection. Nodular subcutaneous lesions leading to skin ulceration (as in kala-azar) were present. These contained parasites, and at first followed the same varying course as those in the lymph nodes. Later, malignant characters developed. P.M. examination proved the lesions to be neoplastic. The authors suggest that overstimulation of the reticulo-endothelial system in this heavily parasitized animal caused the hyperplasia leading to generalized neoplasia.

III. The authors have previously reported that the abnormal growth of the claws of dogs affected with leishmaniasis is due to parasitism of the claw matrix. They now describe a technique for the preparation of smears from the claws for diagnostic examination. The claws are gradually pared down by sharp cutters until the junction of the horn with its matrix is reached when some serous fluid will exude or slight pressure will furnish sufficient for a smear preparation. (Any bleeding will impede a search for the parasites). They claim that positive cases always yield positive smears.

In a discussion on this paper it was pointed out that apparently healthy skin is also useful material for examination of the parasites in suspected cases.

IV. The authors fed 12 *Triatoma infestus* (Kluge) and 200 *Rhipicephalus sanguineus* larvae on a dog affected with leishmaniasis; no evolution forms of leishmania were present in either of the arthropods. They next studied by skin examinations the course of parasitism in this dog (which became infested with lice) and at the same time assessed the varying number of lice and the proportion of lice which became "parasitized". Definite evolution forms of leishmania (those in process of simple division and flagellate forms) were found in the digestive tract of the lice, but no cyst forms were found. The lice left their host progressively as the skin lesions developed.

The authors suggest that lice may be secondary hosts of *L. canis*.

V. This is the clinical history of a case of canine leishmaniasis which was under treatment from December, 1984 to July, 1987, with anthiomaline (intraven. and intramusc.). Dosage varied from 1 c.c. to 3.5 c.c. of a 6% solution, and was irregularly spaced according to tolerance.

The dog was eventually destroyed. At autopsy no parasites could be demonstrated, but the spleen was irregularly sclerotic, and there was chronic nephritis.

Several cases of leishmaniasis of children were encountered in the same village.—C. V. WATKINS.

SÁNCHEZ BOTIJA, C. (1936). Leishmaniosis canina. Algunas observaciones sobre los caracteres generales del foco endémico en Madrid. [**Canine Leishmaniasis in Madrid**].—*Trab. Inst. Biol. anim. Madr.* 4. 70-87. 3 figs., 1 table. [Also appeared in *Rev. Hig. Sanid. pecuar.* 26. 148-158].

The author examined 2,230 dogs of Madrid for leishmaniasis during 1935, and found 178 cases (7.9%). Half the affected animals had cutaneous lesions, most of which were visible on naked eye inspection, but some were only found by microscopic examination. Diagnosis in general was based on clinical examination, on microscopic biopsy, and on the formol gelification test. A general clinical account is given.

MALBRANT, R. (1938). Piroplasmoses du Congo français. [**Piroplasmoses in the French Congo**].—*Bull. Soc. Path. exot.* 31. 599-603. [2 refs.]

Blood films from cattle with anaemia and enlarged lymph nodes were examined at the Pasteur Institute of Algiers, and *Theileria parva*, *Th. mutans* and *Anaplasma marginale* were identified. Anaplasms were observed in the blood of sheep at the experiment station of the Pasteur Institute at Brazzaville in an outbreak in which five lambs and one sheep succumbed. A number of adult healthy sheep were found to be carriers, but symptoms were only observed in sheep from the province of Linzola.—S. J. GILBERT.

NEITZ, W. O. (1938). The Destruction of *Piroplasma canis* by the Neutrophils and Large Mononuclear Leucocytes.—*Onderstepoort J. vet. Sci.* 10. 83-86. 3 figs., 1 table. [9 refs.]

A case of biliary fever is reported in which *P.c.* was phagocytosed by the large mononuclear leucocytes and neutrophils. In contradistinction to the activity of the mononuclears which ingested the parasites and their host cells, the neutrophils were concerned with the destruction of the extracellular parasites.

COLES, J. D. W. A. (1937). A New Blood Parasite of the Fowl.—*Onderstepoort J. vet. Sci.* 9. 301-307. 10 figs. [11 refs.]

C. describes an apparently new blood parasite of the fowl in New York and Philadelphia. It is intra-erythrocytic and about one-third the size of *Aegyptianella*

*pullorum*, which it most closely resembles. The virulence seems to be very low. A similar, if not identical, organism occurs in South Africa.

MIESSNER, H., & DEDIÉ, K. (1987). Leptospirosis bei Silberföchsen. [**Leptospirosis in Silver Foxes**].—*Dtsch. tierärztl. Wschr.* **45**. 809-818. 6 figs., 2 tables. [Numerous refs.] [Résumé published in *Dtsch. Pelztierz.* **13**. 25].

The authors record investigations, on seven farms, into a disease of silver foxes which is prevalent in the Hanover area between June and October. Though on most farms the losses are small, on two they reached 40% and 45% respectively of the season's whelps. The P.M. findings were very similar in all cases, consisting of jaundice, punctiform haemorrhages in the lungs, degeneration of the liver, slight enlargement of the spleen, haemorrhages in the bladder, and catarrhal inflammation of the stomach and intestines. In only one case was the presence of leptospira proved by subinoculation, although four g. pigs and 12 mice were inoculated with blood, organ suspensions and urine. Leptospira could not be detected in the blood by dark-ground illumination, though in one case they were demonstrated by blood culture. The organisms were occasionally detected in the urine of sick and recovered foxes, but in all cases they had lost their motility. It is stated that leptospira were detected in sections of lung or kidney, stained by Levaditi's method, in all cases in which the preparation of sections was undertaken. [The number of animals examined by this method is not given]. In one experiment, kidney material from a recovered fox produced leptospiral infection when inoculated into g. pigs and when fed to another fox caused fever, jaundice and death.

The disease in foxes is said to occur in a peracute form, characterized by meningitis and death in about two days, in an acute form characterized by jaundice and emaciation, and in a latent form, with slight jaundice and some loss of appetite.

The epidemiology of the disease is discussed, and the authors point out that it may be contracted by eating rats or through contact with water infected by rats. The condition is peculiar in that only one or two foxes out of a number in a pen may contract it, and that cases occur irregularly throughout the pens without any particular tendency to spread to the pens nearest the original outbreak. The possibility of foxes carrying infection is discussed, but in no cases has the urine been proved infective, and it appears that fox urine is too acid to allow any prolonged survival of leptospira. Agglutination tests carried out with serum from a few recovered foxes and various strains of leptospira indicated that the disease was due to the classical *L. icterohaemorrhagica*, the cause of Weil's disease in man.—U. F. R.

KLARENBEK, A., & WINSSER, J. (1938). De leptospirosen bij de kleine huisdieren. Een statistisch en experimenteel onderzoek. [**Leptospira in Small Domestic Animals**].—*Tijdschr. Diergeneesk.* **65**. 666-670. 5 tables. [5 refs.] English, French and German summaries].

Of 76 dogs taken at random and examined serologically for leptospirosis, 85 were positive; in ten cases the infection was by *L. icterohaemorrhagiae* and in 25 cases by *L. canicola*. A difference was noted between the disease caused by the two types, icterus nearly always occurring in the adult animals infected with *L.i.*, but rarely in connexion with *L.c.* Experimental subcutaneous infection in pups produced icterus in almost all cases with both strains.

In experiments in young cats, *L.i.* caused a slight but specific serum reaction and the *canicola* strain gave rise to a high blood titre; the organisms of the latter strain appeared in the urine.—JAC. JANSEN (UTRECHT).

## DISEASES CAUSED BY VIRUSES

FREI, W. (1938). Neuere Ergebnisse der physikalisch-chemischen Erforschung filtrabler Vira. [**Physico-Chemical Investigations on Filtrable Viruses**].—*Z. InfektKr. Haustiere*. 53. 253-278. [Numerous refs.]

An interesting discussion regarding the identity of viruses. The information regarding molecular size which may be obtained by the differential centrifugation technique is considered and the recent work done with the virus of tobacco mosaic disease is used as an example. The nature of viruses is then discussed under the following headings:—response to pH, resistance to disinfectants and radiations, adsorbability, antigenicity, plurality of types and infectivity (*i.e.*, the size of the dose which is capable of producing infection). Under the heading "The Origin of Viruses", F. discusses the hypothesis of spontaneous generation of viruses.

—E. J. PULLINGER.

PAIC, M., KRASSNOFF, D., HABER, P., REINIÉ, L., & VOET, J. (1938). Dimensions approximatives des ultravirus et des bacteriophagés d'après les données fournies par l'ultrafiltration. [**Sizes of Viruses and of Bacteriophage as Calculated from Ultrafiltration**].—*Ann. Inst. Pasteur*. 60. 227-269. 11 figs., 7 tables. [Numerous refs.]

The authors describe the development of the ultrafiltration method of measuring virus particle size, with special reference to their own work. They discuss the value of the ultrafiltration method, and stress the fact that in the measurement of the size of small particles the medium in which these are suspended may influence filtration. A table of approximate sizes of viruses is given, the suspending medium being stated in each case, but it is pointed out that these sizes are approximate only, and may be subject to greater variation than is generally realized.—E. J. P.

WALDMANN. (1937). "Maul- und Klauenseucheinbruch in Deutschland". [**Foot and Mouth Disease in Germany in 1937**].—*Dtsch. tierärztl. Wschr.* 45. 711.

ANON. (1937). Abwehr gegen Maul- und Klauenseuche. [**F. & M. Disease in Germany in 1937**].—*Ibid.* 788-789. [1 ref.]

HIMMEL. (1937). Der Einbruch der Maul- und Klauenseuche. [**The Outbreak of F. & M. Disease in Germany, 1937**].—*Dtsch. Tierärztebl.* 4. 493.

All three papers cover the same ground and concern the recent pan-European outbreak.

The importation of sheep from North Africa to France was responsible for the European outbreak of 1937. The disease spread eastwards through Alsace to Germany, and 3,500 premises were involved between September and November. The infection was of Type A; the virus was found to be extremely infective, the incubation period being about 24 hours. Heart lesions were not observed, and the virus was considered to have a medium degree of virulence. Secondary lesions in the feet were observed earlier than in previous outbreaks due to Type A.

Strong veterinary-police measures succeeded in arresting the spread of infection after three months. The importation of hay, straw and meat was prohibited, and communication between infected premises was reduced to a minimum by the closing of markets, schools and churches. The hyperimmune Type A serum was found to be of great value.—E. C. HULSE.

NAGEL, H. C. (1937). Untersuchungen über das Verhalten des Maul- und Klauenseuche-Virus im Zentralnervensystem kleiner Versuchstiere. [**Foot and Mouth Disease in the Central Nervous System of Small Animals**].—*Dtsch. tierärztl. Wschr.* 45. 624-625. [9 refs.]

The g. pig was found unsuitable for work on transmission by brain infections, but 125 passages through brains of white mice increased the virulence of the virus. During the course of the passages, the virus was detected by g. pig inoculation in the blood, lungs, liver, spleen and spinal cord, as well as in the brain tissue. No clinical or pathological changes were observed in the mice, and the histological changes were limited to a hyperaemia of the meninges, an increase of cerebrospinal fluid, and a round cell infiltration of the cortex.—E. C. HULSE.

- I. JOLTRAIN, E. (1988). Stomatite aphteuse humaine probable. Contagion de l'animal à l'homme. Chimiothérapie. [**A Probable Case of Foot and Mouth Disease Stomatitis in Man**].—*Rev. Path. comp.* **38**. 792-796.
- II. FISCHER, G. (1988). La fièvre aphteuse des animaux peut être transmise à l'homme. [**Transmissibility of Foot and Mouth Disease to Man**].—*Arch. internat. Brucelloses*. **1**. 112-116.

I. The author records a possible case of infection in man with the virus of F. & M. disease, due to the ingestion of milk, and also white cheese, from an affected cow.

II. F. gives a list of the animals susceptible to F. & M. disease. He reviews four groups of cases occurring in man during the past century. The condition in human beings is described, and the probable causes of infection are pointed out.

—G. DODS MUNRO.

- MORNET, M. (1988). Un cas de fièvre muqueuse africaine du boeuf (snotsiekte). [**Malignant Bovine Catarrh in French West Africa**].—*Bull. Serv. Zootech. Epiz. A.O.F.* **1**. No. 1. 11-12.

Malignant bovine catarrh is said to be rather rare in French West Africa. M. gives a case record of an affected bull.—N. J. SCORGIE.

- I. NAKAMURA, N., ISHII, S., & WATANABÉ, S. (1988). Étude sur le virus de l'anémie contagieuse du cheval. Observations expérimentales sur la répartition du virus dans plusieurs organes au cours de formes évolutives non fébriles de la maladie. [**Distribution of the Virus of Equine Infectious Anaemia in the Organs during Non-Febrile Periods**].—*Bull. Off. internat. Epiz.* **16**. 149-160. Discussion pp. 890-892.
- II. NAKAMURA, N., ISHII, S., & WATANABÉ, S. (1988). Étude sur les lésions histo-pathologiques provoquées chez le cheval par l'anémie infectieuse. I. Quelques observations sur le système nerveux. Cerveau et moelle épinière. II. Quelques observations sur les lésions histopathologiques du testicule. [**Histopathological Lesions in E.I.A. I. The Central Nervous System. II. The Testicle**].—*Ibid.* 161-180. 22 figs. on 6 plates, 2 tables. Discussion pp. 890-892.

I. A series of normal horses inoculated with the virus of E.I.A. were killed at various stages of the disease. Selected tissues were injected into fresh susceptible animals in order to determine the distribution of virus.

It was clearly shown that the virus was always present in the bone-marrow, for which it appeared to possess a special affinity. It was also recovered from the blood, liver and spleen, but not with regularity. The C.N.S., on the other hand, was invariably affected. The authors do not, however, regard the causal agent as a neurotropic virus, but consider that the C.N.S. is a particularly favourable site for its conservation.

II. The C.N.S. of horses artificially infected with the virus of E.I.A., together with natural cases, was subjected to a detailed histological examination. The

main changes noted in the brain were a proliferation of the neuroglial cells, a migration of leucocytes around the cerebral blood vessels, and a perivascular cellular infiltration which was most marked in the later stages of the disease. Various degrees of neuronophagia were noted, the cell degeneration in the spinal cord being particularly marked.

Cytoplasmic and nuclear inclusion bodies were found in the Purkinje cells and elsewhere, but they were very small (0.25-0.1 of the diameter of the nucleus).

It is suggested that the virus of E.I.A. in the early stages exerts a powerful action on mesodermic tissue, stimulates the blood vessels and increases the numbers of histiocytes: later it attacks the ectodermal tissue.

The examination of testicles from affected horses revealed a syndrome which the authors attribute to the action of the virus. The first change was a degeneration of the germinal cells which took the form of pycnosis or caryolysis. The capillaries were dilated and the interstitial tissue was hyperaemic. After an animal had passed through two or three febrile crises, however, an acute interstitial reaction was produced which was characterized more by degenerative than by proliferative changes. There was an accompanying reaction in the form of an infiltration of mononuclear and histiocytic cells collected into well-marked centres. In some instances the cells of Sertoli were more or less normal, but in others they showed a severe and rapid necrosis.

In the terminal stage there was a massive cellular infiltration of the interstitial tissues leading to the production of fibrous tissue and accompanied by a marked atrophy of the organ.—R. E. GLOVER.

PIGOURY, L., BORDE, R., & BERNARD, M. (1938). Intensité du syndrome anémie dans le surra expérimental du cheval. Comparaison avec l'anémie infectieuse. [Intensity of Anaemia in Experimental Surra. Comparison with Equine Infectious Anaemia].—*Bull. Soc. Path. exot.* 31. 622-626. [6 refs.]

The symptoms, evolution and lesions of acute E.I.A. and surra are almost identical. Two horses were inoculated with *Trypanosoma evansi* isolated from an epidemic of surra in Syria and a comparison was made on them of tests applied for the diagnosis of E.I.A. The tests carried out were blood sedimentation, coagulation, the mercuric chloride, albuminuria, and the presence of haemosiderin in the liver. Except for the absence of a true albuminuria in surra, the results obtained in these tests were identical in both diseases. A positive c.-f. test for *Tryp. evansi* in the absence of this parasite would indicate a dourine infection. It is possible for E.I.A. and surra to occur simultaneously in the same animal, but surra should yield to treatment with naganol and tryroxyl, or with naganol and antithiomaline, which have proved fully effective in Syria.—S. J. GILBERT.

WEBSTER, L. T., & WRIGHT, F. H. (1938). Recovery of Eastern Equine Encephalomyelitis Virus from Brain Tissue of Human Cases of Encephalitis in Massachusetts.—*Science*. 88. 305-306. 2 tables. [3 refs.]

In the autumn of 1938 there was a bad outbreak of eastern type equine encephalomyelitis in Massachusetts, and simultaneously some cases of fatal encephalitis occurred in children. The authors received brain tissue from the latter and succeeded in transmitting a rapidly fatal encephalitis through four passages in Swiss mice, as well as through other animals. The results corresponded closely to those obtainable with the eastern equine encephalomyelitis virus. Finally virus neutralization tests, using antiserum prepared against the latter virus, showed that the virus from the children's brains was the equine encephalomyelitis virus of the eastern type. The antiserum was capable of protecting mice against 10<sup>8</sup>

M.L.D. intracerebrally. This is the first proof of the occurrence of equine encephalomyelitis infection in man.—J. E.

KELSER, R. A. (1987). **Transmission of the Virus of Equine Encephalomyelitis by *Aedes taeniorhynchus*.**—*Science*. **85**. 178. [1 ref.]

The Western type of equine encephalomyelitis can be passed from g. pig to g. pig by *A.t.*—in one case production of the disease and death occurred within five days. There is no proof as yet that the Eastern type can be so transmitted. Details of the experiment were published in a later article [below].—G. W.

I. KELSER, R. A. (1988). **Transmission of the Virus of Equine Encephalomyelitis by *Aedes Taeniorhynchus*.**—*J. Amer. vet. med. Ass.* **92**. 195-208. 1 table. [7 refs.]

II. TRAGER, W. (1988). **Multiplication of the Virus of Equine Encephalomyelitis in Surviving Mosquito Tissues.**—*Amer. J. trop. Med.* **18**. 887-898. 1 table. [14 refs.]

I. Transmission experiments in Panama incriminated *A.t.* as a vector of equine encephalomyelitis virus. Only the western type of the virus was transmitted, however, experiments with the eastern type giving negative results in all cases.

Although accurate recordings were impossible, it appears that the virus undergoes some change within the mosquito. Transmission is not mechanical, and time, therefore, is required after the ingestion of virus-containing blood before infection of a clean host is possible. Such a period appears to be longer in *A.t.* than in other *Aedes* species.

Determination of the duration of infectivity of the mosquito in question was impossible owing to the difficulty in keeping it alive in captivity for extended periods, but a few surviving mosquitoes were still infective after 82 days.

A short report of earlier work on the relationship of western type virus to *A. vexans* is incorporated. It would appear that this species is also capable of transmitting the virus.

II. An account is given of the behaviour of the western strain of the virus of equine encephalomyelitis in the presence of tissues of *A. aegypti*. The mosquitoes were reared under aseptic conditions, and a number of tissues from them were explanted to a nutrient solution to which heparinized g. pig or chicken plasma had been added.

A strain of the virus was maintained by mouse brain passage, and virus cultures were commenced from this source. Titration by intracerebral inoculation of recently weaned mice followed.

Best results were obtained with a series started in larval thoracic tissue, sub-cultured to pupal head tissue in seven days, reinoculated to larval thoracic tissue seven days later, sub-cultured again to pupal head tissue in seven days, and finally tested after a further seven days, when a titration 100,000 times higher than the original suspension was recorded. The virulence and serological properties of the virus remained unchanged.

Relatively poor results were afforded by the other tissues employed.—D. D. O.

DONATIEN, A., & LESTOQUARD, F. (1938). **Nouvelles recherches sur l'intradermo-réaction dans la peste porcine. [Various Applications of the Intradermal Test for Swine Fever].**—*Bull. Acad. vét. Fr.* **11**. 308-316. 1 table. [3 refs.]

Using the intradermal technique previously described [*V.B.* **8**. 486.], the authors examined 108 samples of blood from suspected outbreaks of S.F. and from normal animals, and confirmed the high accuracy of the test. The presence of

various secondary organisms, e.g., *Salmonella cholerae-suis* and *Erysipelothrix rhusiopathiae*, does not invalidate its accuracy. The interpretation of the reactions requires considerable experience and should not be undertaken by practitioners.

The intradermal reaction is also of value in detecting differences in the antigenic value of strains of S.F. virus. Strains which induce poor skin reactions are unsuitable for the preparation of hyperimmune sera. The titration of unknown sera by this method is also described.—R. E. GLOVER.

- (1938). **Report of the Committee on Rabies.** [U.S. Live Stock Sanit. Ass.]  
—*J. Amer. vet. med. Ass.* **92**. 807-810.

It is recommended that strict measures of quarantine, vaccination and the destruction of stray dogs should be enforced in all States. The control and eradication of rabies should be under the direction of the federal government in co-operation with the state governments, and there should be close co-operation between the medical and veterinary professions.

More outbreaks of rabies were reported in Illinois than in any other state. Of 1,528 heads examined, 581 were positive; three human deaths occurred, and 4,475 treatments were issued. It is estimated that there are approximately one million dogs in Illinois alone.

Vaccination alone did not prove satisfactory in the control of rabies except in those areas where the greater part of the dog population had been vaccinated.

—E. C. HULSE.

- BALOZET, L. (1937). La vaccination antirabique des animaux en Tunisie du 1er janvier au 31 décembre 1936. [**Antirabies Vaccination of Animals in Tunis during 1936**].—*Arch. Inst. Pasteur Tunis.* **26**. 424-429. 1 table. [5 refs.]

Statistics are given of the antirabic vaccinations performed during 1936. Approximately 2,000 dogs were vaccinated, including 98 that were so dealt with after they had been bitten; no cases of rabies were reported following this treatment. From 1931 to 1936, 31 horses were vaccinated, of which one subsequently died of rabies; 82 cattle and one camel were also treated, with no subsequent losses.—E. C. HULSE.

- I. BERNKOPF, H., & KLIGLER, I. J. (1937). **The Cultivation of Rabies Virus in Tissue Cultures.**—*Brit. J. exp. Path.* **18**. 481-485. [5 refs.]
- II. SCHLEIFSTEIN, J. (1937). **A Rapid Method for Demonstrating Negri Bodies in Tissue Sections.**—*Amer. J. publ. Hlth.* **27**. 1288-1285. [17 refs.]
- III. BERTONI, G. (1938). Sur la méthode classique de Pasteur pour la vaccination antirabique. [**Pasteur's Classical Method for Rabies Vaccination**].—*Ann. Inst. Pasteur.* **60**. 189-194. 1 table. [13 refs.]
- IV. LÉPINE, P., & SAUTTER, V. (1938). Etat du virus fixe dans les vaccins antirabiques phéniqués. [**State of Fixed Rabies Virus in Phenol Vaccines**].—*C. R. Soc. Biol. Paris.* **127**. 192-194. 1 fig. [8 refs.]

I. Fixed rabies virus was cultivated *in vitro* in mouse embryo brain medium. Serial sub-cultures were maintained in chicken plasma with tyrode-rabbit serum; human serum improved the growth. At the seventh sub-culture the virus was infective for rabbits at a dilution of 1:100. When monkey serum was used for mass cultures, the virus increased in virulence up to the seventh culture; it was avirulent by the 20th. Formalin (1:1,000) inactivated the cultures after one hour at 37°C., and in 48 hours in the refrigerator,

II. The section is fixed in Jenker's solution for four hours. Paraffin sections are prepared with the use of dioxan and are then stained with a modified Wilhite stain. The time taken from the removal of the brain to the completion of the sections is about eight hours. The Negri bodies are stained a deep magenta red colour, contrasting with the bluish violet of cytoplasm and the copper colour of red blood cells.

III. Since the introduction of the original Pasteur technique, the fixed virus has undergone considerable modifications in its ability to resist desiccation. At some Institutes the virus is now avirulent after four days. B. briefly reviews various aspects of this variation; he suggests that glycerin may have some toxic action on the virus when it is used as a preservative of the dried cords.

IV. Although a phenolized vaccine may be avirulent for rabbits by subcutaneous inoculation immediately after preparation, it is virulent for 6-10 days when inoculated intracerebrally. Rabbits thus inoculated show typical nuclear lesions near the site of inoculation and especially in the neurones of Ammon's horn. It would appear that the fixed virus forms a stable complex with the phenol and that this constitutes a safe method for the attenuation of the virus.—E. C. H.

VIRGA, E. (1938). Sulla virulenza e sulla resistenza ai vari agenti di attenuazione del virus rabbico fisso. [**The Virulence and the Resistance to Attenuating Agents of Fixed Rabies Virus**].—*G. Batt. Immun.* 20. 47-68. [Numerous refs.] [English, French and German summaries].

V. reports that the fixed rabies virus at the Palermo Institute has been passaged 2,687 times, and is no longer virulent to rabbits on subcutaneous injection, but is still virulent when given by nerve, eye or skin; it resists drying for 7 days, glycerin for about 2 months, contact with ether for 10 days and contact with phenol for 11 days.

These results differ from those of REMLINGER in that the virus he examined showed little or no resistance to glycerin or drying. In view of this and the fact that other workers have reported differences in the virus maintained at their Institutes for the production of vaccines, V. suggests that Institutes producing antirabies vaccine should issue a yearly report on the virulence and other properties of the virus used in order that the results of vaccination may be compared.

—J. A. NICHOLSON.

NAIDU, P. M. N. (1938). **Rabies Prophylaxis in Dogs with Special Reference to the Development of the Single Injection Method in Mysore**.—*Indian vet. J.* 15. 21-28. 3 tables.

N. states that [? in his opinion] in India the only method of control of rabies in dogs would be through an efficient system of preventive vaccination. Any method of vaccination based on Pasteur's original method or its modifications would, however, be impracticable. Therefore N. suggests that a single-injection prophylactic vaccine and at the same time a curative vaccine of high value [no suggestion concerning method of production] should be tried.

For prophylaxis the glycerinated phenolized vaccine of Umeno and Doi, and the phenol-glycerinated vaccine modified by Kondo are under investigation. The Nigerian modification of Semple's vaccine, and the Italian modification (Finzi) of the Japanese vaccine are being used for curative purposes.

The results achieved so far are said to be encouraging, and the work is being continued.—D. D. OGILVIE.

- I. M'CORRY, P. A. (1938). **Suspected Aujeszky's Disease ("Pseudorabies"—"Mad Itch")**. [Correspondence].—*Vet. Rec.* 50. 454-455.
- II. GALLOWAY, I. A. (1938). **Aujeszky's Disease. Common Synonyms: "Pseudo-Rabies", "Infectious Bulbar Paralysis", "Mad Itch"**.—*Ibid.* 745-762. [Numerous refs.]

I. The author refers to the suspected outbreaks of "mad itch" reported by HARVEY and REID [*V. B.* 8. 640.], and by HART; he mentions a similar outbreak which he saw in Ireland in 1914. In all these outbreaks the infected cattle had intense pruritus of the hind quarters (tail, rump, vulva, thighs, etc.), sweating, gnawing and licking of the itching parts, and finally exhaustion which caused death.

II. G. brings together and reviews the available information on Aujeszky's disease; his article should be read in the original. Aujeszky's disease and rabies have little in common except that both are produced by filtrable viruses and cause symptoms referable to lesions in the central and/or peripheral nervous system. The itch symptom does not occur after intracerebral inoculation, and in the case of infected pigs it is absent. The disease in pigs appears to be relatively mild, though highly contagious, and does not seem to be contagious among small laboratory animals. Horses, dogs, cats, cattle, sheep, pigs and rats have become infected under natural conditions. In dogs it is a rapidly fatal disease. Occasionally, human beings have accidentally acquired infection in a mild form. Cats and rabbits are very susceptible to small doses of virus. Among cattle and sheep the disease is reported to be fatal, but not contagious. The means of spread are not clear. Transmission by subcutaneous inoculation or by the bite of an infected animal does not readily take place. Negri or similar inclusion bodies are not found. Pigs and monkeys and, to a lesser extent, g. pigs, are more resistant than cattle, dogs and rabbits. The serum of recovered pigs can neutralize the virus. The existence of outbreaks has been proved experimentally in Hungary, Austria, France, Russia, Rumania, Denmark, Tunis, North and South America, Holland, Spain and Yugoslavia. Clinical evidence indicates the possible existence of the disease in the British Isles, Switzerland and Germany.—J. A. GRIFFITHS.

- I. FRAUCHIGER, E. (1938). **Der erste Fall einer Poliomyelitis acuta anterior, "Kinderlähmung", beim Tier. [The First Case of Infection with the Virus of Human Poliomyelitis in an Animal]**.—*Schweiz. Arch. Tierheilk.* 80. 70-76. 2 figs. [3 refs.] [Also appeared in *Schweiz. med. Wschr.* 68. 128-129].
- II. FRAUCHIGER, E., & HOFMANN, W. (1938). **Erfolgreiche experimentelle Poliomyelitisimpfungen auf das Rind. [Successful Transmission of the Virus of Human Poliomyelitis to Cattle]**.—*Ibid.* 260-262. [1 ref.]

I. The report of a naturally occurring alleged case of poliomyelitis [*i.e.*, human infantile paralysis] in a young bovine. [This report should be read with considerable reserve, because of the extreme difficulty of confirming the diagnosis in such an instance. At the same time the report is important because of the bearing it has upon various unconfirmed records of milk-borne epidemics of infantile paralysis].

II. The authors claim to have transmitted poliomyelitis by injecting virus from human cases into two young bovines, by the nasal, peritoneal and spinal (lumbar puncture) routes. Paraplegia resulted, and biochemical tests and cytological examination of cerebrospinal fluid gave results resembling those found in human poliomyelitis.—E. J. PULLINGER,

FAIRBROTHER, R. W., & MARTIN, A. E. (1938). **Serologic Studies in Epidemic Influenza with Particular Reference to the Persistence of Antibodies after Infection.**—*Lancet*. **234**. 718-720. 3 tables. [6 refs.]

The results of these authors bear out the view expressed by FRANCIS and his colleagues [*V. B.* **8**. 287.] that antibodies to influenza virus do not persist for long after infection. After an attack of influenza the antibody content of the serum was found to rise considerably, but this level was not maintained. In 10-12 months the antibody titres as determined by complement-fixation and mouse protection tests tended to fall to levels similar to those before infection.

There appeared to be a relationship between antibody levels and susceptibility to infection.—D. L. HUGHES.

AJELLO, P. (1936). Una nouva forma di localizzazioni extragenitali del sarcoma di Sticher (prove positive de trapianto). [**Venereal Lymphosarcoma of the Dog : Extragenital Localization**].—*Clin. vet., Milano*. **59**. 147-164. 6 text figs., 2 figs. on 1 plate, 1 table. [Numerous refs.]

A. discusses venereal infective tumours on the genital organs of dogs, and describes a case. He succeeded in infecting five dogs out of six by subcutaneous injections of unfiltered tumour tissue, but other experiments with tumour filtrates were negative.—S. F. J. HODGMAN.

I. LESBOUYRIES, G. (1938). Les leucoses des oiseaux. [**Avian Leucoses**].—*Rec. Méd. vét.* **114**. 257-269.

II. UHL, E. (1938). **Active Immunization of Chickens against Chicken Leukosis with Agent Adsorbed by Aluminium Hydroxide.**—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 544-551. 2 tables. [13 refs.] [In English].

I. This article, which consists of a useful review of the literature on avian leucoses, is not such as can be adequately abstracted, and should be consulted in the original by all those interested in the subject.

The literature is marshalled under the following headings:—(a) The erythroid and myeloid leucaemias are very easily transmitted. (b) Lymphoid leucosis, which is usually aleucaemic, may be transmitted. (c) Neurolymphomatosis (fowl paralysis), usually aleucaemic, may also be transmitted. (d) Lymphomatous leucaemia (lymphomatosis) and neurolymphomatosis are two aspects of the same disease. (e) All the types of avian leucoses are the same disease. (f) Certain types of tumour, particularly the avian sarcomata, are transmissible. (g) The avian leucoses may be accompanied by tumours of the same cellular character. (h) These leucoses may also be accompanied by tumours of a different cellular character. (i) There are similarities between mammalian and avian leucoses.

The article has one serious defect in that there are no references apart from the names of the authors and the dates.

II. Using material from the spleens of fowls with leucosis, adsorbed by aluminium hydroxide, U. attempted to immunize ten hens and 15 chicks. One month after the last inoculation the surviving ten hens and 11 chicks were tested for immunity to leucosis by the inoculation of leucotic material. Four hens and three chicks survived repeated inoculations of such material, four hens and four chicks acquired some degree of immunity as evident from a prolonged survival time when compared with similarly inoculated controls, and two hens and four chicks had no immunity. The plasma of the immune birds possessed bodies that neutralized the leucotic agent *in vitro*.

[The number of experimental birds employed appears to have been inadequate, and it is difficult to draw any conclusions from the results].—D. L. HUGHES.

NAGAHATA, S., & IKEGAYA, S. (1938). **Anti-Vaccinal Serum and its Anti-Viral Body.**—*J. Jap. Soc. vet. Sci.* **17**. pp. 1-17 of pt. 1. 12 tables. [8 refs.] [In Japanese: abst. from English summary pp. 1-2 of pt. 2].

Rabbits injected intravenously with 1 c.c. of a 1:5 dilution of glycerinated calf-lymph per kg. body weight were completely protected by five intravenous injections of 5 c.c. per kg. body weight of hyperimmune anti-vaccinal serum, the first being given one hour later, and the remaining four on the four succeeding days.

The serum, prepared by hyperimmunizing calves with glycerinated calf-lymph, was subjected to fractionation of its proteins. The euglobulin fraction was raised in amount, and further tests demonstrated that it is to this fraction that the protecting power of the serum is most closely related.—D. D. OGILVIE.

### PARASITES IN RELATION TO DISEASE [ARTHROPODS]

ONO, S. (1938). **Studies on Warble-Flies of Manchuria and Inner Mongolia.**—*Kitasato Arch.* **15**. 199-216. 8 plates, 16 tables, 8 graphs. [11 refs.] [In English].

Since 1925, O. has published a number of papers on the general problem of warble fly in Manchuria and Inner Mongolia. While reiterating some of the matter contained in these publications, the present study is directed chiefly to the problem of further elucidating the role of "hypodermatotoxin" in perforation of the skin by the parasitic larva and in migration through the body of the host.

"Hypodermatotoxin" is contained in the midgut of the first and second stage larva, but subsequently disappears and is replaced by cell debris. The action of the toxin was readily demonstrable by inoculation of test animals and it is considered that lysis by this substance is the actual mechanism of skin penetration.

Particular attention is directed to the action of the toxin on germinal cells. When a normal female rabbit was mated with a male rabbit treated with sublethal doses of toxin (5-13 doses of 2-20 c.c. of 0.025-0.2% toxin solution over 68-135 days), a large number of the offspring showed abnormality, especially of the gall-bladder. If, however, the females were injected with toxin and mated with normal males, the offspring were normal.

A detailed review of the morphology, bionomics, migration of larvae, and life-history of the warble flies of the region (*Hypoderma lineata* and *H. bovis*) is incorporated.—D. D. OGILVIE.

DINULESCO, G., & VASILESCO, C. (1937). Etude anatomo-pathologique des tumeurs duodénales chez le cheval produites par les larves de *Gastrophilus meridionalis* (Pillers et Ewans [Evans]). [**Duodenal Tumours Caused by Horse-Bot Larvae (*G.m.*)**].—*Archiva vet.* **29**. No. 6. 1-11. 10 figs. [3 refs.] [In French].

The authors describe the gross pathology of intestinal infestation of horses by *G.m.*, and the histological structure of the tumours which are formed in the duodenal wall due to the presence of larvae. The horses had come from Spain and were examined at an abattoir in Paris; the first instar larva is found in the buccal and pharyngeal mucosa, the later instars in the intestine.

The second stage larva penetrates the mucosa of the duodenum to the serous coat, where its presence causes an inflammatory reaction; granulation tissue results, and finally a fibrous tumour forms around the larva. After moulting to the third

instar, the larva emerges from this "cell" into the lumen of the duodenum, and attaches itself by the anterior segments to the wall of the intestine.—J. MACLEOD.

THOMSEN, M. (1988). Stuefluen (*Musca domestica*) og Stikfluen (*Stomoxys calcitrans*). Undersøgelser over Biologi og Bekaempelse samt en Oversigt over andre til Husdyr eller Boliger knyttede Fluearter. [Biology and Control of *M.d.* and *St.c.*, with a Survey of Species of Flies Associated with Domestic Animals and Houses].—*Beretn. Forsøgslab., Kbh.* No. 176. pp. 352. 107 text figs., 30 figs. on 13 plates, 30 tables. [Numerous refs.]

This book is intended as a source of information for everyone interested in rural and general hygiene. Research work on the biology of the two most important species of flies has finally led to a system of effective control. Under circumstances typical of rural conditions in Denmark it is found that *M.d.* lays most readily in swine dung, less readily in horse and calf dung, and hardly ever in cow dung, especially when not much straw is mixed in it. A thorough daily cleaning out of the stables is necessary to prevent propagation of the fly. The swine dung is placed on the dunghill first, and then covered with horse and calf dung, and finally with cow dung. If the daily dung heaps are placed in proper tanks and the above covering system is persevered with during the summer, very few house-flies develop. On farms where the cows are at pasture and no cow dung is available for a top covering, the swine dung should be covered with sheets, which can be made by sewing sacks together, e.g., sacks used for saltpetre, etc. Any modification of the covering method can be used as long as it prevents egg laying and the development of larvae.

The problem of controlling *St.c.* is simpler. In Danish farms most of these flies are bred in the calf boxes, consequently the first essential is a frequent cleaning out (at least once a week) of the boxes and of the stable in general; this should be done throughout the year. In sheltered stables the development and egg laying continue into the winter, and unclean and moist corners often become breeding places. During the summer it is necessary to cover the dung from calf boxes in the manner already described.

The book contains excellent illustrations showing the different covering systems. There is, however, much to do in the way of education and organization before the anti-fly campaign will receive the full co-operation of the common people in the rural districts.—H. C. BENDIXEN (COPENHAGEN).

FENTON, F. A., & BIEBERDORF, G. A. (1936). Fly Control on A & M Farms, Stillwater, Okla. —*J. econ. Ent.* 29. 1003-1008. 2 figs. [2 refs.]

An account of measures taken to deal with the fly problem created by the high concentration of cattle, poultry, and animal sheds near an agricultural college at Stillwater, Oklahoma. The measures included disposal of manure or its treatment with borax powder, spraying of the barns with pyrethrum, trapping of flies and the use of poison baits. [Little significance can be attached to the recorded results since all measures were operative simultaneously and no steps were taken to determine the extent of seasonal fluctuation in fly numbers or the possibility of variation due to causes unrelated to the measures adopted. The species of flies concerned are not stated, but the flies caught in the traps were mainly *Musca domestica*].—J. MACLEOD.

I. BARRETT W. L., Jr. (1937). Natural Dispersion of *Cochliomyia americana*. —*J. econ. Ent.* 30. 873-876. 1 table. [4 refs.]

II. BORGSTROM, Floreine A. (1988). **Studies on Experimental *Cochliomyia americana* Infestations with Special Reference to the Bacterial Flora and the Development of Immunity.**—*Amer. J. trop. Med.* **18**. 395-411. [10 refs.]

I. Although the permanent establishment of the screw-worm fly *Cochliomyia hominivorax* Coq [*C. americana* C. & P.], as a species is restricted within recognized northern limits by winter temperatures, cases of infestation occur in summer north of this survival area. Much of this seasonal spread is due to the movement of livestock, but natural unaided dispersion may apparently also be responsible in certain areas. B. found that between March and August, 1986, the species spread over 500 miles northward from Uvalde, Texas, at an average rate of about 35 miles per week, and north east for over 300 miles. The marginal areas from which this seasonal dispersion occurred had a relatively low density of fly population.

II. The fact that experimental infestation by ten or more larvae of *C.a.* invariably caused death of g. pigs suggested that the lethal effect must be due less to destruction of tissue than to bacterial or enzyme activity or to metabolic by-products of the larvae. An endeavour was therefore made to determine whether recovery resulted in the development of immunity.

Bacteriological examination of natural and experimental infestation wounds showed that a species of *Proteus* was a constant, and, after 24-48 hours of infestation, the sole bacterial inhabitant of the lesion. The characters of the species are given, and the name *Pr. chandleri* suggested. General and local immunization of g. pigs against this species, by intraperitoneal and subcutaneous injection of successive increasing doses of culture, failed to produce immunity against the effect of subsequent infestation.

G. pigs experimentally infested with sublethal numbers of larvae were found on recovery to survive reinfestation by numbers of larvae which were sufficient to kill control animals. This immunity was similarly conferred by treatment of experimental lesions with the exudate of larval infestations. Further, a mortality of up to 50% of the larvae occurred at the early stages of reinfestation. The immunity appeared to be confined to the area of the primary lesion, and to disappear after 20-40 days. [The precise value of the results is slightly obscured by discrepancies in successive references to the same experiments].—J. MACLEOD.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

ORTLEPP, R. J. (1987). **South African Helminths.—Part I.—Onderstepoort J. vet. Sci.** **9**. 311-336. 21 figs. [Numerous refs.]

Seven new species of helminths are described, viz:—*Echinococcus felidis* from a lion, *Anoplocephala* (S.L.) *genettae* from a genet, *Gyrocampa kiewietii* from a plover, *Dubioxyuris macroscelidis* from an elephant shrew, *Subulura dentigera* from a guinea-fowl, *Heteroxyndema vlakhaasi* from a hare, and *Hyracofilaria hyracis* from a hyrax. In addition, a new family of the Oxyuroidea, viz, Dubioxyuridae, is created for the reception of the parasite from the shrew. The status of the three species *Subulura sutoria* (Molin), *S. differens* (Sonsino) and *S. brumpti* (Nopey-Neyra) is discussed, and evidence is brought forward to show that these three species are co-specific.

VAN DER WESTHUYSEN, O. P. (1988). **A Monograph of the Helminth Parasites of the Elephant.**—*Onderstepoort J. vet. Sci.* **10**. 49-190.

A synopsis of all the hitherto known helminth parasites of the Indian and African elephant is presented. The author examined a large proportion of the

genera and found it necessary to augment the description of certain structures and also to amend the diagnosis of a few of the genera.

The trematodes considered consist of eight species belonging to five genera, and the cestodes are represented by only one species, all hitherto known parasites.

The nematode collection contained specimens of practically all the species so far described, with the addition of two new species belonging to the genera *Choniangium* and *Grammocephalus* respectively. The family Strongylidae is represented by six genera with 35 species, the family Ancylostomidae by three genera including seven species, and the family Syngamidae by one genus with one species. Of these ten genera, four are found in the Indian elephant only. The nematodes were further found to exhibit a fairly strict host specificity in that no one species was found which is common to both the Indian and African elephant. However, a species of the genus *Grammocephalus* was found which combines more or less the features presented by the two previously described species, one of which parasitizes the Indian, and the other the African, elephant.

From a study of larvae found amongst the collection, remarks on possible life-histories of the genera *Grammocephalus* and *Murshidia* are presented.—J. R. M.

EISENBRANDT, L. L. (1938). **On the Serological Relationship of some Helminths.**—*Amer. J. Hyg.* **27**. 117-141. 7 tables. [Numerous refs.]

Following the establishment of serological relationships in the vertebrates, E. considers that chemical phylogeny could, with profit, be extended to the invertebrates.

Extracts of the helminth parasites were made in saline solution in as fresh a state as possible. The concentration of nitrogen in each extract was determined in order to safeguard against the use of unequal amounts of antigen. Antisera were then made in rabbits, an amount containing a total dose of 0.0096 g. total nitrogen being injected into an animal of 2,500 g. body weight. This small amount of antigen was found to have as great a stimulating effect as much larger doses. The reactions were tested in each instance by the precipitin test. A wide variety of species extending through two phyla were tested, and the results tabulated. In interpreting serological similarity, the titres of the precipitin tests were expressed as percentage values of the homologous titres which were regarded as 100%. Reciprocal tests did not generally give exact agreement, and unfortunately prevent the data of this work from being of primary importance. The complexity of the antigen structure causes further complication. The reliability of the tests is demonstrated, however, by the constant results observable in several species.

While a study of the results reveals numerous minor deviations, it appears that, in general, the serological relationship of helminths agrees with the present taxonomic classification. E. urges the necessity for serological work on smaller groups of parasites where it seems that useful and detailed results might be achieved.—D. D. OGILVIE.

WU, K. (1937). **Susceptibility of Various Mammals to Experimental Infection with *Fasciolopsis buskii* (Trematoda: Fasciolidae).**—*Ann. trop. Med. Parasit.* **31**. 361-372. 16 figs. on 2 plates, 1 table. [17 refs.]

Encysted metacercariae of *F.b.* were fed to six pigs, four dogs, four cats, one sheep, one goat, one ox, and a number of other mammals.

In the pigs practically all those recovered were mature, and located in the duodenum. They appeared to be of low pathogenicity.

Flukes were found in only one of the dogs. They were immature and were situated in the duodenum.

The remaining animals appeared to be resistant to *Fasciolopsis*, and showed no signs of infection.—D. D. OGILVIE.

CAWSTON, F. G. (1938). **The Cause and Treatment of Bilharzia Disease.**—*S. Afr. med. J.* **12**. 51-52.

C. mentions the occurrence of fork-tailed cercariae in several species of water snails in South Africa. The question of methods of giving tartar emetic other than intravenously is discussed. Rectal infusion did not seem to be of much value, but when the drug was rubbed as an ointment into the skin of the abdomen of human patients the results were promising.—E. M. ROBINSON.

KAU, L. S., & WU, K. (1938). **A Note on the Pathology of Schistosomiasis Due to *S. japonicum* among Cattle in China.**—*Ann. trop. Med. Parasit.* **32**. 129-132. 2 figs. on 1 plate. [1 ref.] [See also *V. B.* **8**. 776].

A further study of the livers and spleens of cattle and water buffaloes with schistosomiasis is reported.

Marked atrophy, with fibrosis and adhesions, occurred in both organs. The fibrosis often extended to the bile ducts and gall-bladder. Some of the livers contained small yellowish nodules, of which some were calcified and others filled with greenish pus. No parasites were found in these nodules. In oxen the organs were more often of normal size than in the water buffaloes, and adhesions were uncommon.

Histologically, atrophic cirrhosis from chronic passive congestion, round cell infiltration with "pseudo-tubercle" formation, and ova with eosinophiles, round cell and endothelial cells in attendance were demonstrable, and also areas of necrosis.

—D. D. OGILVIE.

I. CANARD. (1937). Contribution à l'étude de l'habronémose gastrique et de ses complications. [**Gastric Habronemiasis in Horses**].—*Rev. vét. milit.* **21**. 251-259.

II. FAURE, L. (1938). Nouveau traitement des plaies d'été (habronémose cutanée). [**New Treatment for Summer Sores (Habronemiasis)**].—*Cah. Méd. vét.* **8**. 35.

I. During numerous autopsies carried out on horses and mules in Madagascar and South Africa, it was noted that gastric habronemiasis was often complicated by secondary infection of the spleen. Lesions, symptoms and treatment are described. Some evidence is produced to indicate that *Hippobosca* may be a vector.

II. Three cases are described in which the local application of "kéléve", a refrigerant, brought about a cure. It was necessary first to scarify the affected part. F. suggests that the curative action of "kéléve" is both physical and chemical.—F. II. MANLEY.

ORTLEPP, R. J. (1937). **Some Undescribed Species of the Nematode Genus *Physaloptera* Rud., together with a key to the Sufficiently Known Forms.**—*Onderstepoort J. vet. Sci.* **9**. 71-84. 8 figs. [Numerous refs.]

O. described three new species, namely *Ph. immerpani* from hedgehogs, *Ph. losseni* from a hawk, and *Ph. tasmani* from a chameleon. In addition he gives a key for the identification of the 71 sufficiently known species.

RAO, M. A. N. (1938). ***Poteriostomum ratzi* (Kotlan, 1919).**—*Indian J. vet. Sci.* **8**. 131-132. 2 figs. [1 ref.]

The presence of *P.r.* in horses in India is recorded for the first time. Three

males and one female of this species were found in the large intestine of two ponies in Madras. The general characters of the male worm are described.—D. D. O.

## IMMUNITY

GORET, P. (1988). Quelques aperçus sur la chimie de l'immunité. Conception actuelles sur la nature des antigènes. [**The Chemistry of Immunity. Modern Conception of the Nature of Antigens**].—*Rec. Méd. vét.* **114**. 577-609. [15 refs.]

A simply written review article of the researches which have led up to the modern chemical concepts of immunity. In an introductory section G. discusses the *in vitro* antibody studies upon which all the early theories of immunity were based. The term antigen is defined and is classified as follows:—

— True (complete) —> A stimulator and binder of antibody.

Antigen—  
 — A binder of antibody without visible effect *in vitro*, and thus sometimes classed as an inhibitor of agglutination, etc.  
 — Partial (haptene)  
 — A non-stimulator.

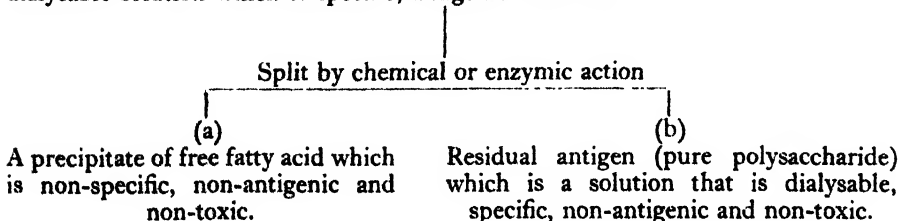
Antigens may be divided into a number of classes:— 1. *Natural proteins*. 2. *Chemical antigens*:— (a) simple diazo groupings; (b) complex substances such as lipoids, hormones, enzymes, etc. 3. *Bacterial bodies and fractions thereof*. 4. *Toxins*. 5. *Filtrable viruses*. 6. *Natural fluid antigens*:— (a) specific, e.g. blood serum, etc.; (b) non-specific, e.g. Forssmann antigen.

Certain of these classes of antigen are then discussed in detail, chief attention being paid to the natural proteins and bacterial antigens.

**Natural Proteins.**—The work of OBERMAYER and PICK and of LANDSTEINER and his school is outlined, mention being made of the importance of the diazo grouping and certain other binding groups for determining the ability to stimulate antibody production, whilst the haptene portion determines specificity. Factors playing a part in specificity include the actual chemical ring structure, amine and other functioning groupings, aliphatic chains and isomerism.

**Bacterial Antigens.**—This section consists of a review of what is known about the chemistry of bacterial antigens, with special reference to the fractionation of the pneumococcus and salmonella groups. This section of necessity includes considerable mention of the studies of BOIVIN and MESROBEANU on the "antigène complet" [*V. B.* **7**. 187.] which is explained as follows:—

"Antigène complet" (*i.e.*, polysaccharide + fatty acid), an opalescent non-dialysable solution which is specific, antigenic and toxic.



—E. J. PULLINGER.

KOTLJAROVA, H. (1937). Serodiagnostics brucella u ovec pri estestvennom i eksperimentalnom zaraženii. [**Serological Tests for the Diagnosis of Brucellosis in Sheep; Natural and Experimental Infection**].—*Brucellosis in Sheep*. pp. 177-203. Numerous tables, 6 graphs. [18 refs.] Moscow: Voen. Publ. Dept.

Studies began in 1933 on the relative diagnostic value of the agglutination test and of the complement-fixation test in brucellosis on a total of 10,724 sheep on the Commission's Experimental Farm in North Caucasus. Aggl. tests were made with formalin-killed cultures of standard virulent strains of *Br. melitensis* and *Br. suis* in serum dilutions of 1:10, 1:20, 1:40, 1:80, and higher. Customary experience was confirmed, that it is necessary to carry out repeated tests on flocks before the infection is eliminated.

In a further series of tests, 24.1% of the sheep which reacted positively in the morning gave a negative reaction in the evening of the same day. In a series in which sheep were tested either daily or at intervals of five days for a period of up to two months, considerable variations in the titres, and frequent falling off in the titre, were observed. It is considered that reactions at 1:10 and 1:20 dilutions should be looked upon as positive. Similar results were obtained with the c.-f. test.

IRWIN, M. R., & FERGUSON, L. C. (1938). **Increase of Bactericidins in the Serum of Cattle following Recovery from Infection with *Brucella abortus***.—*Proc. Soc. exp. Biol., N.Y.* **38**. 451-452. [3 refs.]

It was previously found [*V. B.* **6**. 699.] that bovine serum had a greater bactericidal action against *Br.a.* than comparable whole blood.

The authors have now tested for its bactericidal properties serum from normal cows and from cows which had been infected, and from whose blood practically all the agglutinins had disappeared, these animals being regarded as "recovered". Control tests were carried out with heated serum, with the complement used, and with a combination of the heated serum and complement.

The tests demonstrated "immune" bactericidins in sera 18-20 months after infection and in the absence of an appreciable agglutinin titre, the bactericidal action being about 25 times greater than with normal sera.—C. V. WATKINS.

MUNGER, Myrtle, & HUDDLESON, I. F. (1938). **The Detection of Antigenic Variants of *Brucella* by means of an Opsonocytophagic Test**.—*J. Bact.* **35**. 255-260. 1 table. [7 refs.]

Fifty-two known antigenic variants and nine normal strains of brucella were compared by the thermo-agglutination test, Aichelburg's fuchsin test [see p. 230.] and the opsonocytophagic test [for latter see *V. B.* **8**. 566 & 648.], and the tests were repeated several times at wide intervals. It had previously been found that the two first mentioned tests had not been consistently reliable when the same strain had been tested on several occasions. The bacterial cells of the antigenic variants were phagocytosed in large numbers, while the normal cultures were phagocytosed only slightly if at all. Only 31 of the variants were positive to the other two tests when tested on one or more occasions, and the opsonocytophagic test is considered to be the most satisfactory.—S. J. GILBERT.

BOIVIN, A., & MESROBEANU, L. (1938). Recherches sur les antigènes somatiques et sur les endotoxines des bactéries. IV. Sur l'action anti-endotoxique de l'anticorps O. V. Sur le pouvoir vaccinant de l'antigène O et sur l'action anti-infectieuse de l'anticorps O. [**Research on Somatic Antigens and Endotoxins. IV. The Anti-Endotoxigenic Action of "O" Antibodies. V.**

**The Vaccinating Power of "O" Antigens and the Anti-Infectious Action of "O" Antibodies].—***Rev. Immunol.* **4.** 40-52 and 197-210. 13 tables. [Numerous refs.] [See also *V. B.* **8.** 755].

IV. Precipitation tests were performed with a *Salmonella typhi-murium* anti-serum and the "O" endotoxins and polysaccharide haptenes of the homologous *Salmonella*, of *S. paratyphi* B, and of *S. enteritidis*. The agglutinating titre for these bacteria was also estimated. Thirty-six mice were injected subcutaneously with 1 c.c. of this serum, and on the next day, together with 36 controls, they received graded doses of the glyco-lipid endotoxins of the three *Salmonella* species. The anti-endotoxic action of this "O" antiserum corresponded with its serological specificity for the endotoxins injected. Similar results were obtained with the antisera and endotoxins of three serologically distinct strains of *Pseudomonas pyocyanea* and with the antisera and endotoxins of *Shigella dysenteriae* [*Bacterium shigae*] and *Sh. paradysenteriae* [*Bact. flexneri*].

V. A rough variant of *S.t.-m.* was shown to be much less virulent for mice than a smooth variant. Thirty-six mice received eight intraperitoneal injections of the glyco-lipid antigen of *S.t.-m.* in doses of 0.001-0.2 mg. at weekly intervals. The serum of these mice precipitated very high dilutions ( $10^{-7}$ ) of the homologous glyco-lipids. Thirty immunized mice and 30 controls were injected (intraperit.) with 0.5 c.c. of dilutions of *S.t.-m.* broth cultures. Nineteen test mice survived, and 13 smooth strains of *S.t.-m.* isolated from them proved as virulent as the original strain. Three tables show that the protective power of glyco-lipid vaccines of *S.t.-m.*, *S.p. B.*, *S.e.* and *Bact. shigae* against *S.t.-m.* infection corresponded with their antigenic relationship. Injection of 1 c.c. of a high-titre glyco-lipid antiserum into mice rendered them slightly more resistant to *S.t.-m.* infection than were control mice. —R. O. MUIR.

WAISH, T. E., & CANNON, P. R. (1938). **Immunization of the Respiratory Tract. A Comparative Study of the Antibody Content of the Respiratory and Other Tissues Following Active, Passive and Regional Immunization.**—*J. Immunol.* **35.** 31-46. 4 tables. [7 refs.]

Following general active or passive immunization of 15 rabbits against *Salmonella typhi* or *S. paratyphi* B, the ratio of tissue-antibodies (of the respiratory tract) to serum-antibodies was found to average 1 : 10. Intranasal vaccination of 33 rabbits with or without previous irritation with formalin solution showed that the ratio of tissue-antibodies to serum-antibodies in tissues regionally vaccinated averaged 1 : 5, although instances occurred of ratios as high as 1 : 1 and 2 : 1. In 21 rabbits vaccinated with two antigens, one given regionally (intranasally) and the other generally (intra-abdominally), the ratio of tissue-antibodies to serum-antibodies in tissues regionally vaccinated was always higher for the regional than for the general antigen. The authors attributed the last results to the local formation of antibody in the tissues regionally stimulated by antigen, and stressed its importance in thus closing a portal of infection.—R. O. MUIR.

JONNARD, R. (1938). Principe de la titration des antigènes et des anticorps par réfractométrie interférentielle. [**The Titration of Antigens and Antibodies by Refractometry**].—*C. R. Soc. Biol. Paris.* **127.** 418-422. [19 refs.]

The addition of increasing amounts of type-specific polysaccharide to a type III anti-pneumococcal rabbit serum demonstrated that the refractive minimum was obtained with a concentration corresponding with neutralization by ordinary methods, that the maximum turbidity appeared for a concentration slightly higher than that corresponding with the refractive minimum, and that certain serum

constituents had an affinity for both specific and non-specific sugars. Analogous experiments with tetanus toxin and antitoxin showed that, apart from certain zone phenomena, refractive minima for different toxins were given by concentrations of toxin practically identical with those which were neutralized by the given amount of serum in *in vivo* experiments.—R. O. MUIR.

BEAUVILLAIN. (1938). Note clinique sur l'emploi du sérum antigangréneux polyvalent de l'Institut Pasteur dans le traitement d'une lymphangite suppurée. [Use of Polyvalent Anti-Gas Gangrene Serum of the Pasteur Institute in the Treatment of Suppurative Lymphangitis in Horses].—*Bull. Acad. vét. Fr.* 11. 135-138.

B. describes a case of suppurative lymphangitis due to staphylococci, in an army mare, giving details of clinical signs and treatment. Four subcutaneous injections of 20 c.c. of polyvalent anti-gas gangrene serum from the Pasteur Institute, at two-day intervals, resulted in complete recovery within 18 days. This account is followed by a discussion of the presence in normal and therapeutic sera of natural non-specific antitoxins.—R. O. MUIR.

RAY, N. N., & DAS, G. C. (1938). The Immunization of Horses for the Production of High-Titre Tetanus Antitoxin. Part II.—*Indian J. med. Res.* 26. 317-320. 2 tables. [2 refs.] [See also *V. B.* 8. 760].

Eighteen horses had been immunized with tetanus toxoid and bled regularly until their titre fell and could not be raised by repeated heavy doses of toxoid. After 4-5 weeks, 12 of them received five increasing doses of toxoid and powdered tapioca and then five heavy doses (500-550 c.c.) of toxoid and 1% calcium gluconate. The average final titre was 1,625 international units, but fell rapidly after several bleedings. The average titre of six horses injected with toxoid was 617 I.U.

—R. O. MUIR.

RAMON, G., BOIVIN, A., RICHOU, R., DJOURICHITCH, M., & MACCOLINI, R. (1938). La séro-anatoxithérapie des toxi-infections en évolution. Ses bases expérimentales. [The Sero-Anatoxic Therapy of Toxic Infections in the Early Stages].—*Rev. Immunol.* 4. 24-39. 6 tables. [9 refs.]

The subcutaneous injection of three groups of four rabbits each with tetanus anatoxin and antiserum, followed by two doses of anatoxin at longer intervals for each group, resulted in the same final titre.

Thirty-seven rabbits, in seven groups, received an injection of tetanus anatoxin or of anatoxin-antiserum mixtures in varying proportions, followed by two doses of anatoxin. There was no immunity after the first dose in animals injected with an anatoxin-antiserum mixture. The injections of anatoxin produced a strong immunity in all animals.

Ten groups of five rabbits each were injected twice, at an interval of 18 days, with tetanus anatoxin or with one of various anatoxin-antitoxin complexes. An injection of 10 c.c. of an anatoxin-antitoxin mixture at flocculation point, or 1 c.c. of a condensed anatoxin precipitate, produced the same degree of immunity as did 5 c.c. of anatoxin. The other complexes produced little or no immunity.

—R. O. MUIR.

BISSET, K. A. (1938). The Structure of "Rough" and "Smooth" Colonies.—*J. Path. Bact.* 47. 223-229. 11 figs. on 3 plates. [15 refs.]

B. stresses the fact that colonial structure is merely a product of the nature of the individual organisms composing the colony. Thus, because rough organisms

tend to lie close together and in threads, they build a colony with the typical "medusa-head" appearance. Smooth organisms, on the other hand, tend to lie separate from one another, and the resulting colony takes on a different appearance. This difference includes a mucoid consistency presumably due to the nature of the surface of the organisms. Between these two extremes are found colonies composed of mixtures of R and S individuals or, alternatively, they may be composed of individuals in the transitional S  $\rightarrow$  R stage.—E. J. PULLINGER.

DOLD, H. (1937). Neue Beobachtungen über antibakterielle Hemmungsstoffe (Inhibine) und antibakterielle Wandlungstoffe (Mutine). [**Investigations on the Bacteria-Inhibiting Substance, "Inhibine", and the Transforming Substance, "Mutine"**].—*Zlb. Bakt. I. (Orig.)*. **140**. 265-268. [See also *V. B.* **8**. 275].

Working with human saliva, D. claims to have shown the presence of an agent which hinders the development of *Corynebacterium diphtheriae*, and which he calls "inhibine". On account of differences in the respective physical characters of the two substances, he considers that "inhibine" is not the same as lysozyme. In addition, he claims to have demonstrated the presence of a substance which tends to cause typical forms of *Corynebact. diphtheriae* to change into atypical forms; this he calls "mutine".—E. J. PULLINGER.

STRAZBERGER, S. (1937). Badania nad zjawiskiem F, Duran-Reynalsa w związku z działaniem antywirusu. [**Duran-Reynals Phenomenon and the Action of Antivirus**].—*Wiad. weteryn.* **16**. 421-430. 7 tables. [5 refs.] [French summary].

Streptococcal or staphylococcal antivirus injected 24 hours before testicular extract caused inflammation and opposed the diffusing action of the latter, but when the two were injected simultaneously, these effects were not produced. Irritant substances such as saponin and turpentine acted in the same way. A 24-hour culture of staphylococci had more or less the same action as the antivirus.

## DISEASES, GENERAL.

SAL, G. (1934). Kórszövettani elváltozások a sertéspestisben és a paratyphysban beteg sertések középonti idegrendszerében és nyirokcsomóiban. [**Histopathological Changes in the Central Nervous System and Lymph Nodes in Pigs with Swine Fever and Paratyphoid**].—*Közl. Oesszehas. élet- és kórtan Kőröböl.* **26**. 95-132. 25 figs. on 4 plates, 2 tables. [Numerous refs.]

[This article was also published in German—*V. B.* **5**. 556. The author has changed his name to SALYI, and the German article was published under the latter name].

CORNACCHIA, G. (1938). Osservazioni e considerazioni su alcune malattie infettive del bestiame in A.O.I. [**Some Infectious Diseases of Animals in Italian East Africa**].—*Clin. vet., Milano*. **61**. 390-393.

African horse-sickness was very prevalent both in horses on the plains and at altitudes of over 2,000 m., mules being found affected in the mountains. C. claims good curative results with intravenous injections of HgI<sub>2</sub> in 45 mules treated.

Rinderpest was wide-spread, but it is said that no facilities for immunization were available where C. was working. It was observed in camels, which were relatively resistant to infection.

In the few cases of camel trypanosomiasis treated, neither naganol, quinine, nor arsenobenzol gave good results.

BELLER, K. [Prof. Dr., Reg.-Rat als Mitglied des Reichsgesundheitsamtes], & ZUNCKER, M. [Dr., Wiss. Angestellter des Reichsgesundheitsamtes]. (1936). *Sammelbericht über die mit Mitteln des Reichs- und Preussischen Ministeriums für Ernährung und Landwirtschaft durchgeführte Forschungsarbeit auf dem Gebiete der Geflügelkrankheiten. [Report on Research on Poultry Diseases Carried out with the Aid of the Reich and Prussian Ministry of Nutrition and Agriculture]*. pp. 112. 12 tables, 8 graphs, 1 map. Berlin: Fritz Pfenningstorff. [8vo]. [RM. 1.50].

This book is a comprehensive account of research work on poultry diseases carried out in Germany. It cannot be systematically abstracted. It covers tuberculosis, coryza, fowl cholera, pullorum disease, coccidiosis, fowl plague, pox, laryngotracheitis, leucosis, fowl paralysis, parasitic and nutritional diseases.

—SASSENHOFF (MUNICH).

FOURIE, P. J., & RIMINGTON, C. (1937). *Living Animal Cases of Congenital Porphyrinuria*.—*Nature, Lond.* **140**. 68. 1 fig.

The authors refer to what they believe to be the first living cases of porphyrinuria in animals yet described. The full account has been published elsewhere [see below].—J. E.

FOURIE, P. J. J. (1936). *The Occurrence of Congenital Porphyrinuria (Pink Tooth) in Cattle in South Africa (Swaziland)*.—*Onderstepoort J. vet. Sci.* **7**. 535-566. 10 figs., 5 tables, 1 graph. [Numerous refs.]

F. describes the occurrence of congenital porphyrinuria in 13 bovines, all of which were the progeny of one bull. Twelve of these cases occurred in a single herd and the thirteenth in a neighbouring herd. F. examined personally six of the 13 cases.

These are the first known living animal cases of the anomaly. A clinical description of four cases is given and a pathological description of two cases. General symptoms were:—

(1) General—animals did not thrive, and remained in poor bodily condition, when kept under ordinary conditions.

(2) Urine—varied in colour from amber in the mild cases to red or reddish brown in the more severe cases. Uro- and coproporphyrin were present in the urine.

(3) Teeth and bones—all were of a reddish brown colour; permanent as well as temporary teeth were affected, and the dentine and cement substance were markedly pigmented, but not the enamel; tendons, ligaments and cartilage were not pigmented.

(4) Photosensitization—sores formed on parts of the body not protected by hair; these healed when the animals were protected against the sun by stabling.

(5) Haematology—there was a slight suggestion of immaturity of the same elements of the blood of different affected animals continuously exposed to the sun, but in these cases there was no well established anaemia for which the porphyrinuria could be blamed.

Cells of the reticulo-endothelial system contained pigment granules, which in general would seem to correspond with the pigment described by BORST and KÖNIGSDÖRFFER [(1929). *Untersuchungen über Porphyria*. Leipzig: S. Herzl.]

Of the affected animals, 77% were males and 23% females. In this respect

the incidence of the condition resembled the analogous condition in man, as well as the incidence of recorded cases of alcaptonuria and albinism, thought to be hereditarily transmitted as recessive characters. There is very strong evidence that the condition in these animal cases was hereditarily transmitted as a recessive character.

"Pink tooth" is suggested as the popular name for the animal cases. This emphasizes the clinical feature of the anomaly by means of which it can be easily differentiated from redwater (piroplasmosis).

RIMINGTON, C. (1936). **Some Cases of Congenital Porphyrinuria in Cattle: Chemical Studies upon the Living Animals and Post-Mortem Material.**—*Onderstepoort J. vet. Sci.* 7. 567-609. 23 figs., 2 charts, 1 appendix. [Numerous refs.]

Of several living bovine cases of congenital porphyrinuria, discovered on a farm in Swaziland, and all the progeny of a single pure-bred shorthorn bull [see above], one animal was slaughtered for experimental purposes. This case, a castrated male, two years four months old, had definite clinical symptoms of photosensitization and passed port wine-red coloured urine, exhibiting porphyrin absorption bands. The bones were found to be coloured a mahogany brown, and on transverse section concentric rings of lighter and deeper pigmentation were seen. The cartilages were normal.

Employing, in most cases, Fischer's methods, R. examined the individual organs and tissues for porphyrins, and pure crystalline materials (methyl esters) were obtained as follows:—in the urine—uroporphyrin ( $275^{\circ}$ - $7^{\circ}$ C.), and coproporphyrin I ( $233^{\circ}$ - $5^{\circ}$ C.); in the faeces, coproporphyrin I ( $243^{\circ}$ - $4^{\circ}$ C.) and its copper complex; in the blood plasma, coproporphyrin I ( $243^{\circ}$ - $4^{\circ}$ C.); bones, uroporphyrin ( $267^{\circ}$ - $7^{\circ}$ C.), and from a small sample derived from another case uroporphyrin ( $273^{\circ}$ - $4^{\circ}$ C.): these esters had copper complexes  $311^{\circ}$ - $4^{\circ}$ C. and  $310^{\circ}$ - $3^{\circ}$ C. respectively. From the mother liquors of the main crystallization was isolated a uroporphyrin with ester M.P.  $253^{\circ}$ - $5^{\circ}$ C., but yielding a normal copper salt; from bone-marrow, uroporphyrin ( $278^{\circ}$ C.) and coproporphyrin I ( $244^{\circ}$ - $5^{\circ}$ C.); from the spleen, uroporphyrin ( $278^{\circ}$ C.); from the liver, uroporphyrin together with its copper complex ( $313^{\circ}$ C.); and from the bile, coproporphyrin I ( $237^{\circ}$ C.). In other instances the yields of pure pigment were too small for identification by other than spectroscopic measurements.

The significance of these pigments belonging to the I series of porphyrins, is discussed in relation to normal haemoglobin synthesis and catabolism and the disarrangements of pigment metabolism occurring in disease and in certain states of intoxication such as lead or sulphonal poisoning, etc. A suggestion is made as to the nature of the anomaly in congenital porphyrinuria, and a provisional scheme of pigment metabolism is mapped out.

Examination of samples of urine from human cases of bilharziasis (schistosomiasis) showed that in this disease the excretion of porphyrins is not appreciably raised above the normal.

Experiments upon the chromatographic purification of uroporphyrin esters are reported, and it is shown that the bone and urine uroporphyrins from these bovine cases (M.P. approximately  $278^{\circ}$ C.) can be separated chromatographically into uroporphyrin I with M.P.  $293^{\circ}$ C. and a uroporphyrin melting at  $260^{\circ}$ C., presumably uroporphyrin III.

The M.P. of bile coproporphyrin was raised by similar treatment from  $237^{\circ}$ C. to  $246^{\circ}$  or  $248^{\circ}$ C., and a small fraction having a coproporphyrin spectrum was separated during the chromatographic treatment.

Dioxan was found to be an excellent solvent for the recrystallization of the porphyrin esters.

- I. TERRELL, E. E., ROBERTSON, O. H., & COGGESHALL, L. T. (1938). **Experimental Pneumococcus Lobar Pneumonia in the Dog. I. Method of Production and Course of the Disease.**—*J. clin. Invest.* 12. 398-492. 26 figs., 1 table, 10 charts. [12 refs.]
- II. ROBERTSON, O. H., COGGESHALL, L. T., & TERRELL, E. E. (1938). **Experimental Pneumococcus Lobar Pneumonia in the Dog. II. Pathology. III. Pathogenesis.**—*Ibid.* 438-493. 32 figs., 3 tables. [Numerous refs.]

I. Pneumococci suspended in a viscous starch broth mixture were implanted into the terminal portion of the bronchial tree of selected healthy dogs by means of injection through a radiopaque catheter under the fluoroscope. The strains of pneumococci chiefly used were a virulent type I strain (A5) and a type II strain (Vo) of considerably less virulence. The total volume injected was 1 c.c. (a further 1.2 c.c. being allowed for the content of the catheter itself). A hard rubber ureteral catheter (size 11) was used, the tip being covered with soft tubing. It was passed as far as possible and then withdrawn 0.5 cm. The right lower lobe was usually chosen for production of the initial lesion. A preliminary injection of morphine sulphate was given, sufficient to quieten the animal and produce a well marked drop in temperature (2°-4°C.) (6 mg. per kg. bodyweight). The larynx was painted with 10% cocaine solution 10-15 minutes before passing the catheter in order to prevent coughing. A special board was used for holding the animal and taking X-rays.

Over 100 dogs were used, and by the method described above, and with appropriate dosage, what is regarded as lobar pneumonia was set up with constancy. With 0.05-0.00001 c.c. of the virulent Type I strain, the onset of symptoms was sudden and the disease ran a febrile course of 3-9 days (average 4 or 5 days) accompanied by increased pulse rate, cough, dyspnoea and prostration. These generally ended abruptly, usually in recovery with a sharp fall in temperature and pulse rate and rapid resolution of the lung lesion. A transient and mild bacteraemia occurred in some cases. The physical signs and X-ray findings were those of lobar consolidation involving one, two or more lobes. Spread which occurred was usually to adjacent lobes, sometimes to the opposite side.

With the larger doses (0.04-0.06 c.c. of Type I) about half of the dogs died and in these cases pronounced bacteraemia was common. With doses of 0.1 c.c. the injection regularly generalized early or late. In these cases consolidation was often incomplete and pyaemic complications were often found P.M. Pneumonia of the same character was produced by Type II pneumococci, but a larger dose was required.

The comment is made that if more than half of the total lung issue was consolidated death always ensued, and that the course of the acute phase and rapidity of resolution also contrasted with the features of the disease as seen in human beings. Most, but not all, animals which eventually recovered showed an early and markedly increased white cell count, chiefly of neutrophiles.

II. Studies were made in the lungs of 58 of the dogs which died or were killed during the experiments referred to in I. Several distinct types of lesion corresponding to different clinical features were found, one of which bore a close general resemblance to lobar pneumonia as seen in man. This type occurred in dogs in which the pathological changes remained localized to the lungs throughout, *i.e.*, the majority of the animals. The lesion was lobar in character, involving whole or continuous parts of lobes, and had a firm, airless liver-like consistency. Con-

solidation of most of the lobes was frequent. The histological characters were also like those of lobar pneumonia in man. The same type of vascular and cellular response was observed with stages of engorgement, red and grey hepatization, followed by complete resolution. The evolution of the process in the dog was, however, more rapid, resolution usually occurring before the stage of grey hepatization was reached (or had become advanced). Examination of large areas did not show the same uniformity of architecture or of cellular exudation as is seen in typical lobar pneumonia of man. The authors feel, however, that the likenesses are sufficient to warrant the use of the term lobar pneumonia for the characteristic localized process described.

Two other types of lesion were found. In one, a fulminating type characterized by marked bacteraemia and early death, there was a coalescent lobular pneumonia associated with great injury to the tissues. In the other, in which the generalized infection progressed more slowly and death occurred in 4-7 days, with extreme bacteraemia and usually pyaemic complications, the lungs were irregularly consolidated and sometimes partially collapsed. In these cases the histological picture showed a combination of lobar, coalescent and non-coalescent lobular pneumonia with some suggestion of interstitial pneumonia, and is designated an irregular diffuse pneumonia.

III. Observations are presented on the successive changes which lead to the typical lesions already described. They are based on a study of 19 dogs killed at 1, 8, 6, 12 or 24 hours after the implantation of various doses in the terminal bronchus. Within one hour a local reaction had occurred consisting of a central area of infiltration, haemorrhagic and exudative in character, surrounded by alveoli filled with oedema in some parts and starch in others, and accompanied by engorgement of the blood vessels, the larger of which showed perivascular oedema. The lesion extended radially, with an advancing zone of oedema-filled alveoli, which in turn were gradually invaded by neutrophiles and erythrocytes until they were filled or distended by the exuded cells. Inflammation of the intra-alveolar septa was inconspicuous, but peribronchial and perivascular oedema was marked. At first peribronchial and lobular, the lesion soon became a continuous area, chiefly of intra-alveolar cellular exudate, and by 6-12 hours suggested the mosaic appearance of the typical human lobar lesion. Within 24 hours a whole lobe was consolidated and spread had occurred to others. During the early hours, spread of the pneumococci is believed to occur chiefly through the lung parenchyma because the organisms are found in the walls of the normal alveoli beyond the oedema zone, but later they are apparently carried through the smaller air passages by oedema fluid.

At the edge of the lesion large numbers of pneumococci were found lying free in the oedema-filled alveoli, in the next zone, that of cellular exudate, they were fewer and lay partly in the neutrophiles, whilst in the oldest part of the lesion showing intense infiltration they were few and nearly all intracellular.

The propagation of pneumococcus infection in the lung of the dog is discussed at some length, together with other apposite work. The three papers are excellently illustrated and tabulated.—A. W. STABLEFORTH.

GUNN, F. D., & NUNGESTER, W. J. (1936). **Pathogenesis and Histopathology of Experimental Pneumonia in Rats.**—*Arch. Path.* 21. 813-830. 2 figs. [10 refs.]

A description is given of the lesions in rats resulting from the intrabronchial insufflation of pneumococci suspended in mucin. The method was that found earlier by NUNGESTER and JOURDONAIS [*V. B.* 7. 64.] to give regularly successful

results, and consisted of the injection of small doses of broth culture ( $10^{-4}$  c.c. in 0.1 c.c. of sterile mucin of relative viscosity 4.5-5.0; or, in some cases doses of  $10^{-5}$  or  $10^{-6}$  c.c.) intrabronchially by means of a canula and fine catheter under light ether anaesthesia. Indian ink was also incorporated in the injection in some cases.

One hundred and ten rats, including six controls with mucin alone or mucin and indian ink, were injected and killed after intervals of from one hour to 11 days. The same strain of Type III pneumococcus was generally used, but in a few experiments a Type I strain was used with similar results.

The lesion usually began at the base of the lung near the diaphragmatic border. The size of the initial lesion was determined by the distribution of the inoculum. The entire inoculum commonly went to one place, but if it was widely distributed the lesion was formed by the coalescing of several foci of oedema and leucocytic exudate. After a few hours, during which the pneumococci increased, the lesions began to spread rapidly in all directions, until arrested by the pleural membrane. The most important mode of spread is believed to be by the flow of oedema fluid through the smaller air passages and pores of Cohn, the bacteria multiplying rapidly in this fluid so long as it is poor in leucocytes. Active migration of leucocytes containing pneumococci is believed to be another probable mode of spread.

The first cellular reaction is that of septal cells, and this is followed quickly by infiltration by polynuclear leucocytes which soon predominate in the exudate. Erythrocytes and fibrin are also regularly present, but vary in relative concentration, the amount of fibrin depending apparently on the intensity of the irritation. Evidence of beginning resolution may appear as early as 24 hours after infection and is usually evident within 48 hours, but in lungs which have been entirely involved it is nearly seven days or more before resolution is complete. Shrinkage of the fibrinous exudate is usually to be seen within about three days, resulting in a mosaic appearance like that found in advanced croupous pneumonia in human beings. Resolution is characterized by the presence of macrophages. These appear to arise chiefly from the local proliferation of septal cells and are mainly, if not entirely, responsible for the liquefaction of fibrinous exudate. Residual thickening of the alveolar walls remains after resolution, and is due largely to the increased number of swollen septal cells.—A. W. STABLEFORTH.

BEVERIDGE, W. I. B. (1937). **Note on an Infection of Sheep with a Pasteurella-Like Organism.**—*Aust. vet. j.* **13**. 155-157. 1 table. [6 refs.]

In a group of ten merino lambs subjected to daily drenching with larvae of *Haemonchus contortus*, three developed diarrhoea, and of these two died and one was killed *in extremis*. B. conducted a P.M. examination on two of these three animals and in both found small necrotic lesions in the liver and pneumonic areas in the lungs. An organism resembling a pasteurella was isolated from the lesions, and laboratory tests indicated a marked similarity to the organism isolated by DUNGAL in Iceland from sheep affected with contagious pneumonia. [Similar organisms have recently been isolated by MONTGOMERIE, BOSWORTH and GLOVER (1938) from cases of enzootic pneumonia of sheep in North Wales—see below].

—T. S. GREGORY.

MONTGOMERIE, R. F., BOSWORTH, T. J., & GLOVER, R. E. (1938). **Enzootic Pneumonia in Sheep.**—*j. comp. Path.* **51**. 87-107. 6 tables. [18 refs.]

An enzootic form of pneumonia is described in sheep in North Wales and East Anglia. The symptoms included a mucoid nasal discharge, coughing, shallow

respirations of the abdominal type and a rise in body temperature. In some cases death occurred as soon as 12 hours after the detection of symptoms; other animals died or were killed 5-7 days later, and a considerable number recovered. The losses rarely exceeded 15% of the flock. Ewes and rams were affected, irrespective of bodily condition. Faulty hygienic conditions and unfavourable weather appear to have been predisposing factors.

The lesions were those of an acute broncho-pneumonia, with a secondary pleurisy arising by contiguity with the consolidated areas. From 18 out of 22 cases an organism related to the *Pasteurella* group was isolated. The organism was encapsulated, haemolytic, indol-negative and of low pathogenicity for experimental animals, thus resembling Group I *Pasteurella*. Serologically, however, it was not identical with any of the recognized members of the group.

Intranasal instillation in healthy sheep of suspensions of affected lungs from natural cases was without effect. Intratracheal injection produced a mild localized pulmonary congestion. A combination of intratracheal and intravenous, or of intratracheal, intravenous and intrapulmonary inoculation resulted in severe illness or even death. The lesions consisted of a fibrino-gelatinous pleural exudate and a similar fluid distended the interlobular septa. Neither in the macroscopic or microscopic appearances was there any resemblance to the lesions found in natural cases of the disease. Similar results were obtained with cultures of the organism.

It is suggested that although the organism itself may not be the primary causal agent, it may be able to establish itself in the lungs following the action of some other factor, e.g., a virus or environmental influences. The disease bears a close resemblance to that described in Iceland by DUNGAL [(1931). *J. comp. Path.* **44**. 126]. No evidence was obtained of direct transmission under natural conditions from affected to healthy sheep.—E. G. WHITE.

STEWART, C. M. (1938). **Non-Sweating in Horses.**—*J. R. Army vet. Cps.* **9**. 161-170.

Attention is drawn to the fact that little of value is known about "non-sweating" or "dry coat" in horses, and S. hopes that this description of his experiences with the condition and his ideas on it may be of some use to future investigators.

The incidence, common symptoms and treatment of the disease are discussed, followed by a description of lesions found P.M. S. then suggests that the condition is due to chronic arsenical poisoning, and sets out his reasons for such a hypothesis, all based on his knowledge of the symptoms and lesions of the disease, and of the habit of those in charge of many racing stables in India of giving arsenic in large doses to their horses.—F. J. ANDREWS.

HRUŠKA, K. (1938). Nakažlivá obrna vepřu a fibrinózní zánět seros a kloubů selat. [**Porcine Enzootic Encephalomyelitis and Fibrinous Arthritis of Piglets**].—*Zvěrolék. Rozpravy.* **12**. 37-42 and 49-51.

H. refers to the main distinguishing signs that should be adopted for the differential diagnosis of porcine enzootic encephalomyelitis [sometimes called Teschin disease] and fibrinous arthritis of piglets. It is sometimes difficult to distinguish clinically between the two infections.

Enzootic encephalomyelitis is caused by an ultrafiltrable neurotropic virus. The chief clinical feature is paralysis. Characteristic histological findings in the central nervous system are those of non-purulent lymphocytic encephalomyelitis; there are no typical lesions in other organs. The infection is transmissible only to pigs. A carbolized emulsion of brain tissue is used as a vaccine.

The aetiology of fibrinous arthritis of piglets is unknown. Bacteriological examination yields negative results. Pathological changes are arthritis and gastroenteritis, and the histological changes are those of cerebrospinal leptomeningitis; there is a close similarity with human rheumatism.—E. PŘIBYL (BRNO).

CUILLÉ, J., & CHELLE, P. L. (1988). La tremblante du mouton est bien inoculable. [**Scrapie in Sheep is Certainly Transmissible**].—*C. R. Acad. Sci., Paris*. 206. 78-79. [1 ref.]

The authors had shown previously [*V. B.* 7. 625.] that scrapie could be transmitted to healthy animals by intra-ocular inoculation of nervous tissue. One of the experimentally infected sheep was killed in a paralysed condition, and the brain and lumbar cord were emulsified in normal saline. Three normal sheep were inoculated with varying doses of brain emulsion by the epidural, subcutaneous and intra-ocular routes respectively; four more were inoculated with cord emulsion, one epidurally, one subcutaneously, and the last two intra-ocularly. Of the seven sheep, two died of intercurrent infections, and two developed the classical symptoms of scrapie. Both the latter had received the cord suspension; one inoculated epidurally developed symptoms 12 months, and the other 19 months, after subcutaneous inoculation. The three remaining sheep still had not developed symptoms 26 months after inoculation. Thus, of the eight sheep inoculated which did not die or were killed prematurely, five developed scrapie. The authors conclude on the basis of these observations that the disease is transmissible by inoculation, after an exceptionally long incubation period of at least one, and more probably two, years.—A. WILSON TAYLOR.

MÜLLER, A. (1938). Chemische Studien am ikterischen Harn. [**Chemical Studies on the Urine in Jaundice**].—*Hoppe-Seyl. Z.* 251. 1-13. 8 tables. [20 refs.]

It is claimed that the urine of patients affected with icterus contains a hitherto undescribed "acid-activated" form of bilirubin. Some of the characteristic properties of this substance are recorded, and in describing the manner in which it differs from ordinary bilirubin, M. draws an analogy between oxyhaemoglobin and ordinary haemoglobin.—E. J. PULLINGER.

MORIN, L. N. (1988). **Studies of a Malady in Sheep**.—*J. Amer. vet. med. Ass.* 93. 82. [1 ref.]

A disease which occurred in a flock of 800 lambs was manifested by bilateral ophthalmia without lachrymation, and by dullness, "pushing", "circling" and paralysis terminating in death. The disease was not invariably fatal. There were no obvious lesions on autopsy, but a listerella-like organism was isolated from the cases examined. [No bacteriological details are given. See also GILL—*V. B.* 8. 78].—D. L. HUGHES.

SCHLEGEL, M. (1988). Fremdkörper und Karies in Zähnen beim Pferde. [**Foreign Bodies and Dental Caries in the Horse**].—*Berl. Münch. tierärztl. Wschr.* Sept. 2nd. 525-529. 2 figs. [18 refs.]

It is mentioned that foreign bodies (short nails) embedded in the cement of molar teeth are occasionally found in the horse and pig. A detailed description is given of the finding of a hobnail in a horse's premolar, with accompanying caries. The incidence of caries in various domestic animals is given, and possible reasons for the differences between the condition in man and the various species of animals are discussed. In man and in carnivora, caries commences with destruction of

the enamel, whereas in the horse and in ruminants the disease primarily affects the cement, the enamel and dentin being only secondarily involved.

Caries is classified, according to the site at which it begins, as superficial (on the grinding surface), interstitial (surface adjacent to neighbouring teeth) and central (commencing in the pulp cavity). Porodontia (exposure of the pulp cavity) and pulpitis are also discussed.—E. G. WHITE.

DAUBNEY, R., HUDSON, J. R., & ANDERSON, J. (1938). **Preliminary Description of a Form of Sterility in Cattle Associated with Vaginitis in Female Stock and with Chronic Changes in the Epididymis and in the Testicles of Bulls.**

—*E. Afr. agric. J.* 4. 31-34. 1 fig., 2 tables.

A disease causing bovine sterility is described, the first cases being observed in Kenya about 1928. Available evidence suggests that it is spread by coitus. Of 248 bulls examined on during the last two years on farms owned by Europeans, 86 showed high fertility, 32 reduced fertility, 25 "temporary sterility", and 105 complete sterility. Among the sterile bulls epididymitis was the most common lesion.

In females the disease is associated with severe nodular vaginitis accompanied by a yellowish slimy discharge. In both cows and bulls there may also be dry adhesive peritonitis.

The condition is being combated by treatment of the cases of vaginitis with antiseptic preparations and by the general employment of artificial insemination.

—J. G. MURRAY.

- I. ANON. (1935). **Relationship between Hairless Calves in California and Texas Herds.**—*J. Hered.* 26. 355-356. 1 chart.
- II. REGAN, W. M., MEAD, S. W., & GREGORY, P. W. (1935). **An Inherited Skin Defect in Cattle. The Occurrence of a Sub-Lethal Epithelial Defect in a Jersey Herd, and a Plan for Eliminating Lethal Genes.**—*Ibid.* 357-362. 2 figs., 2 tables, 2 charts. [6 refs.]
- III. WIPPRECHT, C., & HORLACHER, W. R. (1935). **A Lethal Gene in Jersey Cattle.**—*Ibid.* 363-368. 2 figs., 3 tables, 2 charts. [11 refs.]
- IV. GOWEN, J. W. (1937). **Contribution of Genetics to Understanding of Animal Diseases.**—*Ibid.* 28. 233-240. 4 figs. [Numerous refs.]
- V. EATON, O. N. (1937). **A Summary of Lethal Characters in Animals and Man.**—*Ibid.* 320-326. [8 refs.]

I. This and the two articles which follow it, deal with hairlessness as a genetic lethal or sub-lethal factor in calves in California and Texas. In both States the condition occurred during in-breeding experiments on two different Jersey strains. In both cases the gene was a simple recessive. It appears that the same gene was responsible for the defect, and its origin was traced to a bull common to the pedigree of both herds.

II. The recent trend towards breeding from a small number of proven sires affords an opportunity for the segregation of recessive lethal genes. In a herd of pure-bred Jersey cattle used for in-breeding, four calves with epitheliogenesis imperfecta neonatorum were produced; three of them were born alive, and of these one lived six hours and the remaining two were killed 15 hours after birth. A scheme is suggested by which it is hoped to eliminate a recessive lethal defect in a Jersey herd by selected breeding on genetic principles; the scheme is still in the experimental stage.

III. Seven hairless calves are recorded in a Jersey herd at periods of pregnancy varying from 142 to 264 days. The presence of large hairless areas

was accompanied by incomplete hoof development and, in some cases, there was a wry tail. The herd was free from tuberculosis and contagious abortion. The proportion of normal to hairless calves was 7 : 1. This is within the expected ratio of an inherited character due to a simple recessive gene. The gene was not sex-linked.

IV. Disease in animals in relation to genetics has received too little attention largely due to the insistence on the importance of bacteria and on campaigns of eradication, vaccination or immunization. The production of disease-resistant strains in plants preceded by many years the realization of the importance of the host in animal diseases.

Examples of lethal genes mentioned include melanosis of the femoro-tibial joint in *Drosophila* which prevents movement and results in death; a number of lethal and semi-lethal genes are known in this fly. In cattle, examples include achondroplasia in the Dexter breed, inherited epithelial defects, and cataract. In the mouse, imperforate vagina is the result of a recessive gene; a form of anaemia in this species is also inherited. In the g. pig, deficiency of complement may be inherited and results in considerable differences in the effects of spontaneous and experimental infections. Resistance of certain strains of animals to tumours is another example of the influence of genetic factors.

G. has found that tobacco mosaic virus has attributes similar to those possessed by genes, being inactivated by ultra-violet light and X-rays in the same quantitative relation.

V. Many of the defects now known to be the result of lethal genes have long been known and described as anatomical monstrosities, but their connexion with genetics is a recent development. A comprehensive list of such conditions in animals and man is given, with references. They include the following :—

(1) Cattle.—(a). Achondroplasia (Dexter and African cattle), resulting in abortion usually during fourth month of pregnancy, a dominant character. Similar condition in Telemark and Holstein cattle fatal a few days after birth, a single recessive character. (b). Anchylosis of the mandibular articulation and shortening of the jaw. (c). Congenital dropsy. (d). Congenital ichthyosis and epitheliogenesis imperfecta; these may be related conditions. (e). Foetal resorption. (f). Hypotrichosis congenita (hairlessness). (g). Muscle contracture. (h). Mummification of the foetus.

(2). Horses.—(a). Atresia coli. (b). Stiff forelegs; the young cannot stand, and usually die.

(3). Sheep.—(a). Absence of claws. (b). Earlessness and cleft palate. (c). Muscle contracture. (d). Paralysis of hind limbs. (e). Skeletal defects—reported in Iceland.

(4). Pigs.—(a). Atresia ani. (b). "Catlin mark"—opening between parietal and frontal bones; animals die within an hour of birth. (c). Cleft palate. (d). Excessive adiposity. (e). Foetal mortality. (f). Hypotrichosis (hairlessness). (g). Muscle contracture. (h). Paralysis.

(5). Poultry.—(a). Abnormal superior maxilla—absent or reduced in size; chicks rarely hatch. (b). Chondrodystrophy. (c). Dwarfs. (d). Broken flight feathers.

(6). Cats.—Lethal white—embryos of homozygous white die *in utero*.

(7). Dogs.—(a). Cleft palate reported in bulldog (recessive). (b). Hypotrichosis—animals born alive, die at an early age (dominant). (c). Paralysis—death of certain nerve cells at 8-14 weeks after birth; not necessarily fatal (dominant).

Various lethal characters in the g. pig, mouse, rabbit, rat, canary and man are also listed.—E. G. WHITE.

LÁSZLÓ, F. (1938). Riesenleber in Kälbern. [**Giant Liver in Calves**].—*Dtsch. tierärztl. Wschr.* **46**. 485-487.

Three cases of giant liver were found in 60,000 calves examined. In one case the liver was macroscopically normal in structure except for size; microscopically only a slight increase in interlobular connective tissue was found, but the parenchymatous cells were increased in size and were irregularly arranged, and in many lobules the intralobular vein was missing. This case was classified as a true hyperplasia and hypertrophy of the liver. The other two cases were classified as a "pseudo-cirrhosis"; these livers were a brownish grey in colour, and tough, the increased inter-lobular connective tissue being apparent macroscopically. The parenchymatous cells were normal in places, but examination of many sections showed a gradual transition to the size and arrangement found in the first case.

—A. T. PHILLIPSON.

- I. LÉTARD, E. (1936). L'anomalie et la maladie considérées comme caractères ethniques. [**Malformation and Disease as Inherited Characters**].—*Festschrift f. U. Duerst*. pp. 189-195. 5 figs. Bern: Verbandsdruckerei. [In French].
- II. VAN DER PLANK, G. M. (1936). Pathologie und Erbllichkeit. [**Pathology and Inheritance**].—*Ibid.* pp. 233-237. 3 figs. [In German].
- III. CARSTENS, P., WENZLER, G., & DÜRR, M. (1937). Einige Untersuchungsergebnisse über Vererbungsercheinungen beim Schwein. [**Inherited Conditions in Pigs**].—*Zuchtungskunde*. **12**. 205-217. 10 figs., 1 table. [Numerous refs.]
- IV. STANG. (1938). Inzucht vom Standpunkt der neuzeitlichen Vererbungslehre. [**Inbreeding in the Light of Recent Knowledge on Genetics**].—*Wien. tierärztl. Mschr.* **25**. 309-313.

I. Several examples of inherited abnormalities are mentioned in the course of this paper, including hairlessness in the dog and cat. A pair of apparently normal siamese cats produced a litter containing two hairless male kittens; a second litter included a female which developed alopecia when fully grown.

A peculiar inherited locomotor abnormality was encountered in rabbits from Marseilles and from Normandy. Affected animals frequently walk on the forelegs only, the hind legs being held vertically and the body being in the position taken by a man walking on his hands. Occasionally, a complete somersault takes place. Attempts are being made to produce a breed of "acrobatic rabbits".

II. Seven cases of epitheliogenesis imperfecta equinum are described among foals of genetically related mares. Hairless areas of skin were found on the limbs and in some cases there was absence of a hoof. Histologically, there was an absence of hair follicles and skin glands. [A case of epitheliogenesis imperfecta in a foal was described by BERTHESEN and ERIKSSON—*V. B.* **6**. 538.—and included histological and genetic investigations].

III. The results of researches published during the last few years in several articles are here summarized so as to be more readily accessible. Pigs used for the study of the genetic characters of atresia ani also carried the lethal factor responsible for "thick leg", in which there is a marked thickening of the subcutaneous tissue usually of the forelegs—probably due to circulatory disturbances. In the male, atresia ani is fatal unless dealt with surgically. In the female, defaecation is usually possible owing to the presence of a recto-vaginal fistula. The lethal factors concerned in these two conditions were shown to be coupled.

A condition in which the iris is devoid of pigment and is white in colour ("Glasäugigkeit") is shown to be due to a single dominant factor which follows the Mendelian law of inheritance.

These inherited conditions illustrate the possible dangers of inbreeding, but this procedure should, nevertheless, be utilised when necessary in order to produce and conserve valuable characteristics.

IV. This is a brief review of inbreeding in relation to human and animal genetics. The advantages and disadvantages are discussed, the latter including decreased fertility, increased number of still births, diminished milk yield and the appearance of a of lethal factors.—E. G. WHITE.

## NUTRITION IN RELATION TO DISEASE

DODDS, G. S., & CAMERON, Hazel C. (1984). **Studies on Experimental Rickets in Rats. I. Structural Modifications of the Epiphyseal Cartilages in the Tibia and Other Bones.**—*Amer. J. Anat.* **55**. 185-165. 2 text figs., 14 figs. on 8 plates, 1 table. [8 refs.]

The authors describe the changes which take place in the region of the epiphyseal cartilage in the head of the tibia in normal and rachitic rats, between four and 12 weeks of age. The essential defect in rickets is a subnormal multiplication of the cells of the epiphyseal cartilage, deficient calcification of these cells, and the crushing of the soft tissue so resulting. The characteristic thickening of the epiphyseal cartilage is the consequence of defective absorption of cartilage from the diaphyseal side which forms a supporting matrix for the cells which ought to be undergoing calcification. In severe cases the thickened cartilage passes into a stage of inactivity, and after a time it is absorbed by cells at the border of the diaphysis which convert it into a characteristic metaphysis.

Excellent macro- and microscopical figures are given, and should be examined.

—J. E.

DODDS, G. S., & CAMERON, Hazel C. (1988). **Studies on Experimental Rickets in Rats. II. The Healing Process in the Head of the Tibia and Other Bones.**—*Amer. J. Path.* **14**. 273-296. 1 text fig., 24 figs. on 6 plates, 2 tables. [10 refs.]

The process of healing of experimental rickets produced in rats by the Steenbock-Block diet is described in detail from studies of haematoxylin-eosin sections, silver preparations and frequent X-ray photographs; the 12 X-ray stages of Bourdillon were used as a scale for measuring the progress of healing.

The first indication was calcification in the rachitic metaphysis close to the edge of the epiphyseal cartilage, whence it spread, first through the metaphysis towards the shaft and later to the cartilage towards the end of the bone. During the latter half of healing the shape of the bone became corrected; haematogenic marrow formed in the new end of the shaft which had been formed from the metaphyseal region; cupping of the diaphyseal line was corrected, the entire epiphyseal cartilage became normal in thickness and structure, and the reorganized trabeculae attained normal dense calcification.—R. ALLCROFT.

- I. HOLMES, C. E., DEOBALD, H. J., & HERRICK, C. A. (1988). **Sulphur and Rickets.**—*Poult. Sci.* **17**. 186-142. 7 tables. [3 refs.]
- II. DE RUDDER. (1987). **Rachitisbekämpfung mit dem "Vitamin D-Stoss". [Treatment of Rickets with a Single Large Dose of Vitamin D].**—*Merck's Jber.* **51**. 18-18. [9 refs.]

I. Feeding trials previously showed [*V.B.* **9**. 155.] that sulphur had a marked beneficial effect in preventing coccidiosis in chicks. Unfortunately, under

certain conditions, the sulphur feeding retarded growth and effected bone formation, resulting in "sulphur rickets". It was found that vitamin D played an important part in the prevention of sulphur rickets. In the experiments described in the present paper, sulphur in various forms was fed to chicks receiving additional vitamin D in the form of cod liver oil, or else by irradiation with a quartz mercury vapour lamp. In addition, one batch of chicks was given sulphur and allowed access to direct sunlight. In all, 1,023 chicks were placed on experiment.

It was found that in order to prevent sulphur rickets and retardation of growth after sulphur feeding the chicks had to have access to direct sunshine. In the groups fed cod liver oil, if less than 2% of the ration was fed, both sulphur rickets and growth retardation resulted. If more than 2% was given to the sulphur-fed chicks, no sign of rickets was evident, but the retardation of growth was as great as in the groups fed less than 2%. Irradiation by means of the quartz mercury lamp appeared to counteract the production of rickets by the sulphur feeding, but growth was not normal, although the retardation was not so great as in the groups fed cod liver oil.

II. With no experimental data to corroborate his point of view, the author discusses the merits of a large single dose of vitamin D compared with many small doses in the cure of rickets in children. Even if his contentions are correct for human beings it is quite probable that they cannot be accepted as being true for dogs and farm animals.—JAMES STEWART.

- I. MALAN, A. I., DU TOIT, P. J., & GROENEWALD, J. W. (1936). **Studies in Mineral Metabolism XXXV. The Role of Iodine in the Nutrition of Sheep.**—*Onderstepoort J. vet. Sci.* 7. 523-532. 1 fig., 2 tables. [4 refs.] [See also *V. B.* 6. 88].
- II. DU TOIT, P. J., SMUTS, D. B., & MALAN, A. I. (1937). **Studies in Mineral Metabolism XXXVI. Fluorine Metabolism in Rats and Bovines.**—*Ibid.* 8. 359-374. 6 tables. [Numerous refs.]
- III. THEILER, A., DU TOIT, P. J., & MALAN, A. I. (1937). **Studies in Mineral Metabolism XXXVII. The Influence of Variations in the Dietary Phosphorus and in the Ca: P Ratio on the Production of Rickets in Cattle.**—*Ibid.* 375-414. 15 figs., 11 tables. [Numerous refs.]

I. When the daily ration of merino ewes contained 0.05 g. KI for a period of about 12 months, no effects were observed on body weight and food consumption. Reproduction was, however, abnormal in all the groups receiving the KI supplement, the effects of which were more pronouncedly deleterious in sheep on a carotene-low diet than when 200 g. greenfeed were supplied daily. The response to increased protein feeding in the form of bloodmeal was marked by the detrimental effect of KI on reproduction. As all the rations could easily be improved both in quality and palatability it is not inferred that the quantity of KI given would adversely affect reproduction in sheep under ideal feeding conditions. The authors concluded, however, that when greenfeed is absent or inadequate, as frequently happens in practice, good quality protein is not available and the incorporation of KI in sheep licks is distinctly dangerous and may even cause losses due to abnormal reproduction.

II. Metabolism studies in fluorine were executed on bovines and rats. Fluorine was determined by the Willard and Winter method. Appreciable amounts of fluorine were retained by bovines on rations to which it was added in the form of  $\text{CaF}_2$ . Bovines retained approximately 2 g. and rats to whose diet 0.1% NaF was added retained approximately 1 mg. F per day under the conditions of the experiment. The percentage of fluorine occurring normally in ash of rats

varies from 0.039 to 0.05 %. The ash per 100 g. empty weight in rats was increased by fluorine feeding. The effect of F on Ca and P in rats was to decrease both elements, while in bovines Ca retention was slightly increased and the P retention pronouncedly decreased.

III. From the results obtained in a 24 months' experiment with growing Frieslands kept under conditions of abundant vitamin D and given low and sufficient P respectively in their rations, but with a varying Ca content, it was concluded that P deficiency invariably leads to rickets or osteomalacia and not to osteodystrophia fibrosa, which, it is suggested, is due to a deficiency of dietary calcium.

Neither the "Erdalkali-alkalizität" nor the Ca : P ratio of the ration was the determining factor in the development of rickets, but both these factors were associated with the severity of the disease produced. Histological examination of the bones was carried out to confirm or otherwise the biochemical findings.

A daily intake of approximately 20 g.  $P_2O_5$ , of which almost 60 % was retained by the body, was found to be sufficient for normal growth in the cattle used, whereas 13 g. was too little. Decreased food consumption of the animals receiving insufficient P was not wholly due to the insufficiency of P, but rather to a disturbance of the Ca : P metabolism in the animal.

DU TOIT, P. J., & MALAN, A. I. (1936). **Mineral Licks for Stock. I. Influence of Phosphorus-Deficiency on Pasture and Cattle.**—*Fmg S. Afr.* 11. 177-180, and 195. 3 figs., 1 table.

This is a popular article for farmers on phosphorus deficiency in cattle. The function of minerals in the animal's body is discussed, particularly that of phosphorus. Pica is first discussed, with the two diseases which may be a result of it, *viz*, "stywesiekte", or stiff sickness, and "lamsiekte" or botulism. The value of phosphorus feeding in areas where it is deficient is emphasized, and the forms in which it can be fed are discussed, such as bone-meal, degelatinized fine bone-meal, precipitated lime phosphates, rock phosphate and superphosphate and, finally, water-soluble phosphates.—E. M. ROBINSON.

HASTINGS, C. C. (1938). **Phosphorous Deficiency in a Heifer.**—*N. Amer. Vet.* 19. No. 9. 26-28. 2 figs.

Four 17-month-old heifers at pasture exhibited signs of general unthriftiness, together with enlargement of the joints of the limbs. A description of the symptoms in the worst affected animal is given. Adult cattle on the same pasture were only slightly affected. The evidence—history of the cases, type of soil and herbage—suggested a phosphorus deficiency. All animals recovered when given 3 oz. of bone-meal daily plus a ration of oats, bran and clover hay.—N. J. SCORGIE.

SCOTT, R. B. (1938). **The Iron-Deficiency Anaemias.**—*Lancet.* 235. 549-552. 2 tables. [7 refs.]

Anaemias due entirely to Fe deficiency are hypochromic and often microcytic, characterized by a low blood Hb content and a low colour index, with no alteration in the number of leucocytes. The broader aspects of iron metabolism are discussed and six different types of Fe-deficient anaemias are described, together with methods of diagnosis and subsequent treatment. In particular, it is emphasized that these hypochromic anaemias are almost always due to losses of blood from various causes, which are fully discussed, and that the first essential in treatment consists in accurate diagnosis of the cause of the anaemia and its subsequent correction.—ALFRED EDEN.

WINTROBE, M. M., MITCHELL, D. M., & KOLB, I. C. (1938). **Sensory Neuron Degeneration in Vitamin Deficiency. Degeneration of the Posterior Columns of the Spinal Cord, Peripheral Nerves, and Dorsal Root Ganglion Cells in Young Pigs Fed a Diet Containing Thiamin ( $B_1$ ) and Riboflavin but Otherwise Deficient in Vitamin B Complex.**—*J. exp. Med.* **68**. 207-220. 19 figs. on 4 plates, 1 table, 4 charts. [12 refs.]

An artificial diet presumably adequate in all respects was given to three young pigs for some weeks, and then the quantity of yeast was gradually reduced while thiamin (vitamin  $B_1$ ) and riboflavin were given in its place. The rate of growth decreased, the general condition of the animals became impaired, and marked ataxia, without motor weakness, developed. Histological examination showed there was a selective degeneration of the peripheral sensory neurone involving its cell body in the posterior root ganglion, the peripheral axone, and the central axone included in the posterior roots and in the posterior columns. No clear-cut abnormalities were seen in the anterior roots or anterior horn cells, and many bundles of well myelinated fibres, probably motor, were evident in sections of the peripheral nerves. The tissues other than those of the nervous system were either normal, or else showed the results of secondary infection.—R. ALLCROFT.

- I. BIRCH, T. W., CHICK, Harriette, & MARTIN, C. J. (1937). **Experiments with Pigs on a Pellagra-Producing Diet.**—*Bio-chem. J.* **31**. 2065-2079. 4 tables. [Numerous refs.]
- II. CHICK, Harriette, MACRAE, T. F., MARTIN, A. J. P., & MARTIN, C. J. (1938). **Experiments with Pigs on a Pellagra-Producing Diet. II.**—*Ibid.* **32**. 844-854. 3 figs., 1 table. [Numerous refs.]

I. Young weanling pigs were fed a diet similar to that with which GOLDBERGER produced blacktongue in dogs and which consisted of 83 parts of white maize, 11 of pea meal, 4.4 of purified casein, 3 of cod liver oil and 2.5 of a salt mixture. The animals became ill with severe diarrhoea in periods varying from 5 to 10 weeks and died unless the diet were changed; they showed a progressive simple anaemia. *Post-mortem* examination showed a condition of necrotic enteritis of the caecum and large intestine.

Addition of 4% or 8% dried yeast or of a corresponding amount of an autoclaved aqueous yeast extract rendered the diet suitable for rearing pigs and effected dramatic cures of animals which had become seriously ill on the unmodified diet.

When a mixture of whole wheat and whole barley was substituted for the maize the diet became just satisfactory. The above "black tongue" diet without addition of yeast, on which the pigs sickened and died, was found satisfactory for rearing young rats.

II. Experiments showed that a pellagra-producing diet similar to that described above could be rendered suitable for rearing pigs by addition of a small daily ration (60 mg.) of nicotinic acid. It seems evident that nicotinic acid or nicotinamide was for pigs the only substance missing in the maize diets fed.

Young rats thrive on maize diets of similar composition to those on which the young pigs sickened and died. When the intake was limited and the necessary calories and protein were made good with purified constituents, riboflavin deficiency was manifested, but no consistent advantage was obtained by giving nicotinic acid or nicotinamide. If one or other of these pyridine compounds is essential for the rat, the amount required must be very small.

From the results of the autopsies of five pigs that died, and the bacteriological observations made at the time, it is concluded that the ulceration and necrosis of the large gut were primarily due to the nutritional defect and that the bacterial invasion was a secondary phenomenon.—R. ALLCROFT.

CHICK, Harriette, MACRAE, T. F., MARTIN, A. J. P., & MARTIN, C. J. (1988). **Curative Action of Nicotinic Acid on Pigs Suffering from the Effects of a Diet Consisting Largely of Maize.**—*Bio-chem. J.* **32**. 10-12. 1 text fig., 2 figs. on 1 plate. [6 refs.]

Two pigs fed for some time on the unsupplemented maize diet described elsewhere by the authors [see previous abstract] developed severe diarrhoea and refused food; their skins were a dirty yellow and covered with scabs, and had lost most of the hair. In addition, one animal had paresis and spasticity of the muscles of the hind quarters, and it was anticipated that both would die within 2-3 days.

Most striking recoveries occurred after injections of 100 mg. of nicotinic acid followed by administration of 60 mg. daily with the food. The appetite returned within 24 hours of the first injection, the diarrhoea abated and the animals began to increase in weight. After six weeks' treatment the skin had the appearance of that of healthy pigs.—R. ALLCROFT.

DEUEL, H. J., Jr., HALLMAN, L. F., & MURRAY, Sheila. (1988). **Studies on Ketosis. XIV. Ketolysis Versus Antiketogenesis as an Explanation for the Action of Carbohydrate on Ketonuria.**—*J. biol. Chem.* **124**. 885-893. 2 tables. [18 refs.]

The administration of glucose, but not of ethyl alcohol, to fasting rats having an exogenous ketonuria produced by feeding sodium butyrate, was followed by a decreased excretion of acetone bodies. A similar difference between glucose and alcohol on the endogenous ketonuria was noted in fasting rats previously fed a high fat, low protein diet. Glucose brought about an almost complete abolition of the ketonuria, while ethyl alcohol was entirely ineffective. From these results it is assumed that ketolysis rather than antiketogenesis is the primary mechanism whereby the metabolism of carbohydrate brings about the abolition of ketonuria.

—R. ALLCROFT.

MACHAN, G. (1988). Untersuchungen über die Alkalireserve im Blutplasma kranker Kühe. [**The Alkali Reserve in the Blood Plasma of Diseased Cows**].—*Arch. wiss. prakt. Tierheilk.* **73**. 414-422. 1 table. [11 refs.]

The alkali reserve of the venous blood of 20 normal and 80 sick cows was estimated by the method of van Slyke. The values for the normal animals varied from 44.8 to 78.6 volumes % of carbon dioxide. Samples taken from five cows at two-hourly intervals over a period of two days showed variations of not more than 2.8%. Twenty of the sick animals showed a low alkali reserve; these were cases of digestive disturbances, acetonæmia, acute mastitis, peritonitis and lymphadenoma, the low alkali reserve appearing to be associated with the alimentary dysfunction which was present in all. If the rumen was opened to the air by means of a trocar and canula or if a permanent rumen fistula was left open, the alkali reserve fell very low—19-20%—rising slowly again when the opening was closed. The intravenous injection of bicarbonate solution into a normal cow produced a rise in alkali reserve which lasted 80 minutes.—A. T. PHILLIPSON.

## PUBLIC HEALTH

HENNINGSEN, E. J., & ERNST, J. (1989). **Milk Epidemic of Scarlet Fever and Angina, Originating from a Milkmaid with Scarlatinal Otitis Media.**—*J. Hyg., Camb.* **39**. 51-59. 2 figs., 8 tables. [14 refs.]

An account is given of a streptococcus epidemic in Denmark with 118 cases

of scarlet fever and about 50 cases of sore throat, with one death. The evidence clearly pointed to the infection being milk-borne, the source being a milkmaid suffering from otitis media. Streptococci of Lancefield's Group A (Type 3 of F. Griffith) were isolated from 108 of the patients and from the discharge from the milkmaid's ear. The epidemic was considered to be due to direct contamination of the milk with streptococci, since the cows in the incriminated herd, and also their milk, were normal (two examinations at an interval of six days). [From the authors' statements it is not quite certain that this conclusion is justified. Thus, the difficulty of controlling conditions on farms cannot be overlooked. The authors admit that an epidemic affecting so many persons would have been unlikely to follow direct contamination of the milk unless the streptococci had actually multiplied in it. While admitting, however, that general experience favours the view that "streptococci of group A grow in raw milk but very poorly", they did not study this point in the present case nor did they refer to the work of PULLINGER and KEMP—*V. B.* 8. 407.—who carried out an exhaustive enquiry on the problem].—F. C. MINETT.

SUERMANN, H. (1987). Untersuchungen über die pH-Zahl und die Bakterienflora des Darminhaltes in den einzelnen Darmabschnitten im gesunden Zustand geschlachteter und notgeschlachteter Kälber und Kühe. Ein Beitrag zur Epidemiologie der Fleischvergiftungen. [**The pH and Bacterial Flora of the Intestinal Contents of Healthy Calves and Cows and of those Slaughtered in Emergency**].—*Inaug. Diss., Hanover*. pp. 71. 4 tables. [Numerous refs.]

S. found that the pH in normal calves fluctuated from 6.7 in the small intestines to 7.4 in the large colon, and in animals killed in emergency from 6.8 to 7.5. In adults nearly the same figures were found. The bacterial flora in the bowel contents of healthy animals was in general the same as in emergency-killed cases. The only important finding was the isolation of *Salmonella enteritidis* Gärtner from the intestinal contents of two emergency-slaughter animals and from one normal animal.—M. F. BENJAMIN.

- I. STANDFUSS, R. (1988). Neuzeitliche Arbeitsweise bei der bakteriologischen Fleischuntersuchung. [**Modern Methods for Bacteriological Meat Inspection**].—*Berl. Münch. tierärztl. Wschr.* Sept. 2nd. 584-587, and Sept. 9th. 551-552. 2 tables. [18 refs.]
- II. POHL, G. (1988). Bakteriologische Fleischbeschau und Anreicherung. [**The Use of Enrichment Methods in Bacteriological Meat Inspection**].—*Z. InfektKr. Haustiere.* 53. 118-121. 1 table. [12 refs.]
- III. BARTEL, H. (1988). Ueber einen neuen Elektivnährboden und seine Bedeutung für die bakteriologische Fleischuntersuchung. [**A New Selective Culture Medium for Bacteriological Meat Inspection**].—*Tierärztl. Rdsch.* 44. 352-354. [2 refs.]
- IV. SCHOOP, G. (1988). Saccharosezusatz zu Drigalski- Conradi- und Gassner-nährböden. [**The Addition of Saccharose to the Drigalski, Conradi, and Gassner Culture Media**].—*Dtsch. tierärztl. Wschr.* 46. 279-281. 2 figs., 2 tables. [11 refs.]

I. For isolating members of the genus *Salmonella*, the author advocates plating on brilliant green-phenol red agar to which may be added saccharose, adonite or salicin; bovine testicle enrichment broth and ammonium broth may be used. Identification rests primarily upon an antigenic analysis firstly of "O"

factors, followed by that of "H" factors. Certain fermentation reactions may also be of great value for classification.

II. A discussion of the methods of examining carcasses for their suitability for food, special attention being given to the contamination of meat by salmonella. The site from which salmonella may most frequently be isolated is the gall-bladder, and thereafter the liver and periportal lymph nodes, the spleen, and the kidneys, in decreasing order of importance. P. stresses the value of inoculating tetrathionate broth for increasing the numbers of salmonella when these are scanty and difficult to isolate.

III. B. advocates the use of Petri dishes of indicator agar containing lactose, saccharose, salicin and adonite respectively. By cultivating the suspected material on such plates it is possible immediately to exclude a large proportion of late-lactose-fermenting coliform organisms. In this way serological examination may be reduced to a minimum.

IV. It is possible to identify most late-lactose-fermenting strains of coliform bacilli and distinguish them readily from salmonella by adding saccharose to Drigalski's, Conradi's or Gassner's selective media.—E. J. PULLINGER.

TARASOV, I. (1937). Konservacija *Br. melitensis* v ovcjem mjasu v uslovijah zasola. [Conservation of the *Br.m.* in Salted Mutton].—*Brucellosis in Sheep*. pp. 419-422. 2 tables. Moscow, Viem. Publ. Dept.

Experiments on g. pigs showed that salted meat from brucella-infected sheep contained viable *Br.m.* for as long as 92 days, and might, therefore, be a source of infection for human beings. It is recommended that, in regions where the disease is prevalent, salted sheep-meat should not be issued for human consumption until at least one month after salting.

VERŠILOVA, P. (1937). Konservacija *Br. melitensis* v ovcjem moloku i v ovcjem brynze. [Conservation of *Br.m.* in Sheep-Milk and Sheep-Cheese (Brynza)].—*Brucellosis in Sheep*. pp. 407-417. 4 tables. Moscow: Viem. Publ. Dept.

Experiments showed that in sheeps' milk with a pH of 6.8 to 6.0, *Br.m.* was viable for 22-40 days at a temperature of 11°C. At pH 5.0 to 4.0 the organisms were viable in milk kept at 11°C. for 15 days, but never for more than 80 days, while in milk kept at 37°C. they frequently perished during the first few days. They survived in milk containing 1.3% sodium chloride, but at concentrations of 5-8% they died out in 10-15 days at 37°C. and in 15-80 days at 11°C.

In a further set of experiments it was shown that in "brynza" cheese prepared from milk infected with *Br.m.* after pasteurization, the bacteria remained viable and infective to g. pigs for 45 days at 11-14°C. The fact that "brynza" cheese made of unpasteurized milk may serve as a source of brucella infection for man is claimed to have been confirmed by epidemiological observations [see p. 228].

PIEPER, H. (1937). Der gegenwärtige Stand der Betäubungsweise an den deutschen Schlachthöfen unter besonderer Berücksichtigung der Betäubung der Kälber. [Present Methods of Stunning Animals in German Abattoirs].—*Inaug. Diss., Berlin*. pp. 87. 1 fig., 25 tables. [Numerous refs.]

P. describes the various methods for stunning animals practised in German abattoirs. The gist of his conclusions is that mechanical stunning by the "Schermmer [captive bolt] gun" is superior to all other methods, especially for prevention of extensive haemorrhages, for cleanliness and rapidity, and on humanitarian grounds.

—M. F. BENJAMIN.

MELLO, A., & MASTROFRANCISCO, N. (1938). A manteiga como veiculo de infecção pela Brucella. [**Butter as a Possible Vehicle of Brucella Infection**].—*Rev. Industr. anim.* 1. 19-27. 3 figs. [Numerous refs.] [English summary].

It is stated that 20% of dairy herds of Sao Paulo are infected with brucella, and that the percentage has doubled in a decade. The authors do not know of any case of human brucellosis contracted from bovines in Brazil.

Three different batches of butter were made, some from raw, and some from pasteurized milk, and infected with mixed *Br. abortus* and *Br. melitensis*, and various injections were made into g. pigs. The results varied, depending on the age and acidity of the butter, and some of the strains used are said to have been of low virulence.

The authors are of the opinion that butter or whey may act as a vehicle of brucella infection, but consider such transmission of infection to be rare.

—A. H. HUNTER.

## THERAPEUTICS

MÖNNIG, H. O. (1936). **A New Fly Repellent and a Blowfly Dressing. Preliminary Report.**—*Onderstepoort J. vet. Sci.* 7. 419-430. 1 fig, 7 tables. [1 ref.]

It was shown that the steam-distilled oil of the plant *Tagetes minima* had strong repellent properties for blowflies and that it was suitable for use in a blowfly dressing.

Carbon tetrachloride and tetrachlorethylene are excellent larvicides for use against blowfly maggots, but tetrachlorethylene is irritating on wounds. Both these drugs are distinctly more effective than benzene.

Emulsions of the above-mentioned substances are suitable as blowfly dressings, and woolgrease was found to be the most satisfactory emulsifier. Particulars are given regarding the preparation of a suitable emulsion.

POCKRANDT, D. (1937). Experimentelle Untersuchungen an Benzaldehyd-, Chlorphenol-, Chlorkresol-, Derris-, Kupferoleat-, Naphthalin-, Petroleum-, Pyrethrum- und Schwefeldioxydhaltigen Hautungezieferbekämpfungsmitteln. [**Trials of Ectoparasitocides**].—*Münch. tierärztl. Wschr.* 88. 399-402.

Although P. found derris to be most effective against warble flies, she states that it is practically useless against *Haematopinus*. She carried out experiments on the lethal effect of the preparations named in the title, and states that they are, in general, more effective against ectoparasites, e.g., *Trichodectes*, *Goniodes*, etc. than derris. The experiments were carried out by placing the parasites on blotting paper soaked in the solution under test, so that they were never immersed in the solution. —M. F. BENJAMIN.

KING, H., LOURIE, E. M., & WARRINGTON YORKE (1938). **Studies in Chemotherapy. XIX. Further Report on New Trypanocidal Substances.**—*Ann. trop. Med. Parasit.* 32. 177-192. 12 tables. [7 refs.] [See also I. B. 8. 659].

Following the discovery that synthalin has a powerful direct trypanocidal action, a number of guanidines, isothiourreas, amines, with alkyl and alkylene chains, were examined for trypanocidal activity. Certain of the diamidines exhibited a powerful trypanocidal action *in vitro*, and the most active member of the series (n. undecane--I : II—diamidine) produced permanent cures in mice and rabbits

injected with *Tryp. rhodesiense*. Undecane had little curative action on mice infected with *Tryp. congolense*, but when given in large doses on the day of inoculation and on the following nine days it had a marked prophylactic action. It had a definite action on human simple tertian malaria, causing the parasites to disappear from the peripheral blood, and the febrile paroxysms to cease. A number of aromatic amidine and guanidine compounds were prepared, and several of these exhibited marked trypanocidal action *in vitro*. Three of them cured mice infected with *Tryp. rhodesiense*. This work opens up a new field in the search for substances of therapeutic value against trypanosomal and malarial infections.—J. M. ROBSON.

VAN RENSBURG, S. W. J. (1988). **Surfen C. therapy in *Trypanosoma congolense* Infection in Bovines and Ovines.**—*Onderstepoort J. vet. Sci.* **10**. 18-20. 2 tables. [9 refs.]

A review of the literature is given. It is pointed out that the reports on the efficacy and toleration of Surfen C show that the results obtained with the drug in various parts of Africa are conflicting. The results obtained by the author at Onderstepoort were disappointing, and he concludes :- (1) that intramuscular injection of Surfen C in the treatment of *Tryp. congolense* infection in bovines and ovines is ineffective, and (2) that the intramuscular injection of Surfen C into bovines causes a serious local reaction.

BUTTLE, G. A. H., & PARISH, H. J. (1988). **Treatment of Tuberculosis in Guinea-Pigs with Sulphanilamide.**—*Brit. med. J.* Oct. 15th. 776-777. [1 ref.]

Sulphanilamide appeared in some degree to inhibit infection of g. pigs with a human strain of TB. When a bovine strain was used, the drug had very little influence on the course of infection in g. pigs, and none at all in rabbits. —J. M. R.

ORTLEPP, R. J., & MÖNNIG, H. O. (1986). **Anthelmintic Tests, Chiefly with Tetrachlorethylene; for the Removal of the Hookworm, *Gaigeria pachyscelis* from Infested Sheep, with Observations on the Effects of this Drug on Other Parasitic Nematodes.**—*Onderstepoort J. vet. Sci.* **7**. 399-418. 1 fig., 8 tables. [14 refs.]

Tetrachlorethylene in doses of up to 10 c.c., carbon tetrachloride up to 6 c.c., and pyrethrum extract up to 5 c.c. had no effect alone against *Gaigeria* in sheep, but when administered in an equal volume of liquid paraffin after 2.5 c.c. of 10% copper sulphate solution, 5 c.c. of tetrachlorethylene was moderately effective, while doses of 7.5 c.c. and 10 c.c. were fairly effective in removing the parasites. Three doses of 10 c.c. of tetrachlorethylene at intervals of 10-14 days practically cleaned a heavily infested flock, directly or indirectly, of *Haemonchus*, *Trichostrongylus*, *Gaigeria* and *Oesophagostomum*.

An emulsion of the drug overcame the undesirable effects—coughing and choking—produced by the liquid paraffin mixture.

Preliminary experiments made in attempts to reduce absorption of the drug from the intestine which causes giddiness are described.

KRANEVELD, F. C., & DJAENOEDIN, R. (1987). **Stephanofilariosis. VIII. Oriënteerend onderzoek betreffende de therapie van het lijden. [Stephanofilariosis. VIII. Treatment].**—*Ned.-ind. Bl. Diergeneesk.* **49**. 382-348. 4 figs. on 2 plates. [English and German summaries]. [See also *V. B.* **7**. 76].

A search was made for a therapeutic agent against stephanofilariosis which would be inexpensive and quickly effective, and be safe in the hands of farmers.

No agent was found fulfilling all these conditions, but the best results were obtained with remedies containing arsenic, e.g., Cooper's "lavene" and "Cooper's dip."

—JAC. JANSEN (UTRECHT).

SCHREYER, W. (1938). Vigantol in der Tiermedizin. [**Vigantol in Veterinary Medicine**].—*Merck's Jber.* 51. 71-75.

A general note on the uses of vigantol, which is a standardized vitamin D preparation made from irradiated ergosterin. It has been used for the past ten years in the treatment of domestic animals and animals in zoological collections affected with forms of avitaminosis-D, such as rickets, osteomalacia and weakness in parturient cows (the so-called "Festliegen").—J. E.

WYSSMANN, E. (1938). Die parenterale Phenoltherapie beim infektiösen Abortus des Rindes. [**Parenteral Phenoltherapy in Bovine Brucellosis**].—*Schweiz. Arch. Tierheilk.* 80. 229-250. 1 fig. [Numerous refs.]

A careful investigation of the possible value of injections of phenol as a method of treating bovine contagious abortion showed that such a procedure had no therapeutic value. Furthermore, W. points out that such injections can cause serious oedema and may even activate latent gas gangrene infections.—E. J. P.

## POISONS AND POISONING

MILLER, W. T., & SCHOENING, H. W. (1938). **Toxicity of Selenium Fed to Swine in the Form of Sodium Selenite**.—*J. agric. Res.* 56. 831-842. 3 figs., 4 tables. [9 refs.]

Eight pigs, four months old, were fed an adequate ration to which were added amounts of Se (as  $\text{Na}_2\text{SeO}_3$ ) varying from 24.5 to 392 p.p.m. In four animals, clinical symptoms became manifest in 10-99 days, and included loss of hair, alteration in the growth of the horn of the hoof, diarrhoea, posterior paralysis, and loss of condition, ending in death. P.M. examination revealed lesions in the viscera and in the joints and bones. These lesions and clinical symptoms resembled those occurring in the natural "alkali disease" amongst pigs. The loss of weight which occurred may have been due to the pigs' aversion to the seleniferous food, an aversion which has been noticed when naturally seleniferous grain has been fed.

—ALFRED EDEN.

ROETS, G. C. S. (1937). **The Distribution and Possible Translocation of Icterogenin in *Lippia rehmanni* (Pears)**.—*Onderstepoort J. vet. Sci.* 9. 583-587. 1 table. [14 refs.]

Icterogenin may be present in variable amounts in the leaves and inflorescence of *L.r.*, whereas only traces are found in the stem and root stele. There is a possible translocation of the toxic substance to the root cortex from the leaves, where presumably it is formed. The further possibility exists that the icterogenin so stored in the root cortex may under certain specific conditions be translocated to the leaves of the plant.

The stage of growth does not appear to be of great importance as far as the toxicity of the plant is concerned. Pruning and cutting cause a marked increase in the concentration of icterogenin in both the leaves and the root cortex. Climatic conditions may to a large extent influence the synthesis and translocation within the plant tissues.

SUTTON, G. D. (1938). **Is the Syringa Berry (*Melia azederach* L.) Poisonous for Cattle?**—*J. S. Afr. vet. med. Ass.* **9**. 75.

Two cases are described in cattle where symptoms of poisoning were apparently due to eating syringa berries, as these were found in quantities in the rumenal and abomasal contents. The symptoms were those of weakness, trembling if made to stand, frothy discharge from the nose, and congestion of the conjunctiva. The temperature was normal. Autopsy revealed congestion of the internal organs, ecchymoses on the heart, and marked pulmonary oedema.—E. M. ROBINSON.

STEYN, D. G. (1937). **The Toxicity of Oil of Turpentine for Domestic Animals.**—*Onderstepoort J. vet. Sci.* **9**. 591-598. 1 table. [9 refs.]

Drenching experiments with mixtures of raw linseed oil, oil of turpentine and extract of male fern were conducted upon horses and rabbits. The following mixture appeared to constitute no danger to full-grown horses in fair condition and in good health:—120 c.c. (4 oz.) of oil of turpentine, 4 c.c. (1 drachm) of extract of male fern, and 600 c.c. (1 pint) of raw linseed oil. Contra-indications are congestion of the kidneys, nephritis or gastro-enteritis.

The toxic doses, symptoms of poisoning, P.M. appearances and treatment of cases of oil of turpentine poisoning are discussed.

## PHYSIOLOGY

MANRESA, M., & REYES, N. C. (1934). **Hematological Studies on Cattle. I. The Hemoglobin, Erythrocytes and Leucocytes in Different Breeds of Cattle in the College of Agriculture.**—*Philipp. Agric.* **23**. 588-603. 9 tables. [6 refs.]

There is rapid degeneration and a heavy mortality among pure-bred cattle from temperate zones when introduced into the Philippines. The work here described was undertaken to examine any changes occurring in the blood of various breeds of cattle and of various crosses. Haemoglobin estimations and blood counts were carried out at 30-day intervals over varying periods. The four pure breeds examined were Indian Nellores, Natives, Holsteins and Herefords, the average haemoglobin content of these being 9.87, 9.48, 8.28 and 6.76 mg. per 100 c.c. blood respectively. The haemoglobin index remained fairly constant and showed no correlation with the white cell count. Animals in poor condition showed a low haemoglobin content. Various crosses of these four breeds were examined, and it is concluded that the haemoglobin content of the blood is useful in determining the adaptability of different breeds.—A. T. PHILLIPSON.

HERTHA, K. (1938). **Nachweis von Nerven im Nabelstrang von Föten und einer Nervenverbindung zwischen Mutter und Frucht. [Demonstration of the Existence of Nerves in the Umbilical Cord of Foetuses, and of Nervous Connexion between Mother and Embryo].**—*Tierärztl. Rdsch.* **44**. 503-509. 2 figs.

The existence of nerve fibres can be demonstrated histologically in the umbilical cord of g. pigs. A peculiar reaction was shown to occur in g. pig foetuses more than three weeks old when the skin, muscles, blood vessels or peripheal nerves of the dam were injured by crushing or by heat, electrical and chemical stimulation having no effect. If the saphenous nerves of the mother were pinched or warmed, the vessels of the corresponding area of the foetus were shown subsequently to be very dilated, especially the veins. Similarly, crushing of the muscles or of the veins of the dam produced a haemorrhagic condition and dilatation of the vessels

in the corresponding areas of the foetus, while searing the skin of the dam had a similar effect. Local anaesthesia of the areas before injury prevented the occurrence of the phenomena. Cases are quoted where a haemorrhagic area was found on the forehead of foetuses of pigs and cattle when the mother had been stunned several minutes before bleeding at slaughter.—A. T. PHILLIPSON.

QUAST, P. (1937). Die graphische Registrierung der Pansen- und Labmagenbewegungen des Schafes unter besonderer Berücksichtigung des Wiederkauens. [**Graphic Registration of Rumen and Abomasum Movements in Sheep**].—*Inaug. Diss., Berlin*. pp. 20. 5 figs. [9 refs.]

Fistulae of the rumen and of the abomasum were made in five sheep and pressure tracings were taken by means of Bruggemann's double balloon method. Sixty experiments were made. With each it was necessary to empty the abomasum of ingesta. The tracings obtained from the dorsal sac of the rumen and from the abomasum showed a distinct rhythm; variations occurred, and were most pronounced in the latter organ. Tracings from the abomasum were interpreted as showing waves of increased tonus, which immediately followed a contraction of the rumen, and also peristaltic waves. Both after feeding and during rumination the frequency of the rumen and abomasum contractions were increased, and showed greater regularity. Ingesta returned to the mouth immediately before a contraction of the rumen, when abomasal tonus was at its lowest. This work is of interest in that previously the graphic method had been used only on cattle.—A. T. PHILLIPSON.

MALAN, A. P., & CURSON, H. H. (1937). **Studies in Sex Physiology No. 18. On the Growth of the Gravid Uterus in the Merino.**—*Onderstepoort J. vet. Sci.* 8. 417-428. 5 tables, 6 charts. [3 refs.] [See also *V. B.* 6. 275].

Expressed as a percentage of the weight of the ewe, the growth of the gravid uterus during gestation is approximately given by  $W$  in the equation  $W = 0.000081t^{2.48}$ , where  $t$  is equal to the gestation age in days. Tables and charts are presented to show the increase in the separate constituent parts of the gravid uterus when their weights are expressed as percentages of the weight of the ewe, of the weight of the gravid uterus and of the weight of the foetal sac. Of these parts the most pronounced growth occurs in the foetus.

MALAN, A. I., MALAN, A. P., & CURSON, H. H. (1937). **Studies in Sex Physiology No. 19. The Influence of Age on (a) Amount and (b) Nature and Composition of the Allantoic and Amniotic Fluids of the Merino Ewe.**—*Onderstepoort J. vet. Sci.* 9. 205-221. 5 figs., 4 tables, 3 charts. [11 refs.]

An analysis was made of the amniotic and allantoic fluids both at full term and at the end of each month of pregnancy. A greater alkalinity was noted in the earlier stages than later. The allantoic fluid was significantly higher in total solids per 100 c.c. than the amniotic fluid, and there was a noticeable increase round about the third month, but there was no further rise. The total N content of the allantoic fluid was much higher than that of the amniotic fluid. Phosphorus and calcium were also higher in the allantoic fluid, but did not show much fluctuation during pregnancy. There was a marked uniformity in composition between the allantoic fluids of the pregnant and non-pregnant horns of the uterus.—E. M. R.

SPRUNT, D. H., McDEARMAN, Sara, & RAPER, J. (1938). **Studies on the Relationship of the Sex Hormones to Infection. I. The Effect of the Estrogenic and Gonadotropic Hormones on Vaccinia and the Spreading Factor.**—*J. exp. Med.* 67. 159-168. 5 tables. [12 refs.]

The authors' experiments in which young castrated male rabbits were used,

seem to indicate that in oestrone there is some factor which has an effect on the tissues of the animal body opposite to that of simple extracts of the testis.

After subcutaneous administration of oestrone in doses of 2,000 international units daily for seven days, the spread of indian ink injected subcutaneously was retarded, but reached and exceeded the normal spread after 24 hours. After oestrone had been administered for three weeks, the spread of indian ink was much less than in control animals, and the resistance to vaccinia virus was greatly increased.

Experiments using gonadotropic hormone were at variance with one another, and no conclusion could be drawn.—J. G. MURRAY.

## TECHNIQUE AND APPARATUS

HIRATO, K. (1938). **A Modification of the Tetrathionate Medium for the Isolation of *Salmonella abortus-equi*.**—*J. Jap. Soc. vet. Sci.* 17. 118-126 of pt. 1. 4 tables. [6 refs.] [In Japanese: abst. from English summary pp. 14-15 of pt. 2].

H. details the preparation of modifications of Müller's tetrathionate broth and Schustowa's tetrathionate agar as selective media for the isolation of *S.a.-e* and *S. typhi-murium* from highly contaminated materials. Specimens should be plated on tetrathionate-eosin-methylene blue agar immediately, and also after 10 hours' enrichment culture in tetrathionate.—R. O. MUIR.

BEVAN, L. E. W. (1938). **The Preservation of Vaccines and Solutions by Chloroform.**—*Vet. Rec.* 50. 944-945.

B. advocates the preservation of vaccines by a concentration of 0.25% of chloroform, stating that this method gave satisfactory results in use for many years in his hands. He advocates its use for certain therapeutic preparations where a preservative is required.—R. O. MUIR.

BENDIXEN, H. C. (1938). **Instrumentarium til Udtagning af Blodprøver. [An Instrument for Taking Blood Samples].**—*Medlemsbl. danske Dyrlægeforen.* 21. 159-162. 3 figs.

The needle is screwed to the centre of a metal plate measuring 25 mm. in diameter. At right angles to the edge of this plate a metal half-cylinder 100 mm. long is soldered, in which the sample tube is placed when in operation. The half-cylinder with the tube constitutes an excellent handle. Under optimal conditions and with proper assistance the new instrument will enable the veterinary surgeon to take as many as one hundred samples per hour.—GUSTAV NAERLAND (OSLO).

JACKSON, C. (1938). **Automatic Control of Fixation Time of Histological Specimens.**—*Onderstepoort J. vet. Sci.* 10. 287-288. 1 fig.

A simple device is described which automatically terminates fixation (e.g. at any desired hour during the night) and sets the tissues to wash. Tissues are placed in the fixing fluid in a container below a running tap, but the water is diverted until such time as the diverting device is moved aside by the release of the alarm of a household clock. For details the illustration accompanying the article should be consulted.

MANDELBOIM, A. B. (1937). **Reakcija Fridmana pri encefalomyelite lošadei. [Friedman Reaction in Encephalomyelitis of Horses].**—*Sovyet. Vet.* Nos. 11-12. pp. 62-64. 2 tables.

The reaction mentioned above is described. It consists of the addition of potassium permanganate to cerebrospinal fluid and then of trichloroacetic acid and the development of a colour reaction and precipitate. [It does not appear to be well authenticated. There is no proof that it is specific for any particular disease].

## MISCELLANEOUS

- (1938). **The 1938 Veterinary Congress Held under the Auspices of the Philippine Veterinary Medical Association at the Assembly Hall of the College of Veterinary Science, Pandacan, Manila.**—*Philipp. J. anim. Indust.* 5. 126-185. 3 photographs.

The full report of the proceedings is given, including membership lists, programme and papers. The latter constitute a summary of the past and present status of veterinary activities in the Philippines. The Philippine Veterinary Medical Association took a leading part in stimulating the government to improve the conditions of the livestock industry, with the result that an act was passed—the "Philippine Livestock Promotion Fund"—by which an impetus has been given to the improvement of breeds of animals. [Scientific matter presented at the congress is dealt with separately in this *Bulletin*].—J. E.

- CLARK, H. C. (1938). **The Development of International Transportation and its Effect on the Practice of Tropical Medicine.**—*Amer. J. trop. Med.* 18. 1-7. [1 ref.]

New and quicker methods of transport have made it much easier for diseases in their incubative stage to be conveyed from one country to another, in comparison with the longer sea voyages which permitted detection before arrival at the destination. Port medical and veterinary officers must be on the alert for the presence of tropical diseases.—T. DUNLOP YOUNG.

- FURLONG, J. R. [Editor]. (1937). **The Preparation of Empire Hides and Skins.** pp. 126. 2 text figs., 20 figs. on 8 plates. London: Imperial Institute. [8vo] [3s. 6d.]

In connexion with its work in promoting industrial utilization of raw material of the British Empire, this book gives detailed information on hide and skin production by all the Dominions and Colonies, as well as chapters on the causes of defects in leather, flaying and preservation, and marketing [see *V. B.* 9. 169].—J. E.

- ANON. (1937). **A extinção da escola de medicina veterinária de S. Paulo.** [**The Extinction of the Veterinary School of Sao Paulo**].—*Bol. Soc. brasil. Med. vet.* 7. 115-122.

The Veterinary Institute, as it was originally called, was created by government decree in 1917, with a qualifying course of three years. After various modifications and a change of site it emerged in 1931 as the Veterinary School of Sao Paulo, under the directorship of Dr Alexandre Mello. In January, 1934, again by decree, the school was incorporated in the University of Sao Paulo. There was a rebellion among the students, and the school was closed in 1937. It has since been reopened.—J. A. PASFIELD.

## OFFICIAL AND OTHER REPORTS

NORTHERN IRELAND. (1938). **Investigation by the Veterinary Research Division, Ministry of Agriculture [1937-38].** [LAMONT, H. G.]—*Rep. agric. Res. Inst. N. Ire., 1937-38.* p. 42.

An experiment on anti-abortion vaccination of calves has been commenced. A dead vaccine is being used; heifer calves will be vaccinated as soon after birth as possible and the vaccination repeated every three months until the heifers are brought into the herd for breeding purposes; a number of calves will be kept as controls. It is stated that the dead vaccine gave unsatisfactory results when used on adult cattle.—J. C. WALLACE.

SOUTHERN RHODESIA. (1938). **Report of the Director of Veterinary Research for the Year 1937.** [LAWRENCE, D. A.] pp. 12. Salisbury: Rhodesian Printing and Publishing Co., Ltd. [fcp].

The Director had no professional assistant throughout the year. The report shows the scope of the routine work.

CALF DYSENTERY was investigated, but the aetiology is obscure.

A detailed description is given of some curious cases of theileriasis. Some of them proved to be EAST COAST FEVER and others remained obscure, as a theileria-like organism observed in calves proved dissimilar to *Th. parva*, *Th. mutans* or *Th. annulata*.

FOOT AND MOUTH DISEASE virus was recovered from a Kudu cow. It was the same type as was infecting cattle. All recovered cattle reacted when reinoculated with the virus after an interval of one year, showing that immunity was not durable under field conditions.

Investigations included treatment of BOVINE HELMINTHIASIS with the standard nodular worm remedy and the nicotine-copper sulphate treatment. Although good results were obtained under field conditions, animals given a prolonged course of treatment at the laboratory were found on P.M. examination to be still fairly heavily parasitized, in spite of their improved physical condition.

The locally known "blind-sickness" in cattle, which has been investigated spasmodically for several years, does not appear to be associated with nitrate of soda poisoning as had been suggested. Nearly 5 lb. of the salt were fed to a 750 lb. cow without ill effect.—J. A. GRIFFITHS.

TRINIDAD AND TOBAGO. (1938). **Report of the Veterinary Division, 1937.** [METIVIER, H. V. M.]—*Rep. Dep. Agric. Trin. Tob., 1937.* pp. 60-65.

FIELD WORK.—Five cases of TUBERCULOSIS were found at abattoirs and testing of "in contacts" revealed nine reactors. Tests on 978 cows in 877 cowsheds gave three reactors only, in rural districts round Port of Spain. In Tobago there were four reactors. All of these were slaughtered. Three cases of ANTHRAX occurred at the Tobago Stock Farm in one pig and two goats. 278 animals were given spore vaccine. 548 cattle from Venezuela and British Guiana were vaccinated. Bat-transmitted PARALYTIC RABIES was responsible for 57 deaths of livestock as compared with 217 in 1936 and 881 in 1935. The incidence of the disease was again highest in the north-east area in Sangre Grande district. There were no outbreaks of GLANDERS, EPIZOOTIC LYMPHANGITIS or SWINE FEVER. The following diseases were noted among livestock:—HAEMORRHAGIC SEPTICAEMIA in three pigs, STRANGLES, INFLUENZA and ULCERATIVE LYMPHANGITIS in mules, PARASITIC GASTRITIS, PNEUMONIA and OPTHALMIA of calves; BOVINE PIROPLASMOSIS (red-water) is enzootic; BOVINE BRUCELLOSIS has a low incidence.

**RESEARCH.**—Research on PARALYTIC RABIES transmitted by bats was carried out by the Government Medical Bacteriologist. The results briefly summarized are:—*Desmodus* bats are susceptible to inoculation with rabies virus and may show furious or paralytic symptoms, or there may be no clinical symptoms, but those with all forms may transmit the disease. Bats “recovered” from the furious form may still transmit infection by bites for prolonged periods, whether naturally or artificially infected.—J. A. GRIFFITHS.

**DENMARK.** (1937). Aarsberetning fra Veterinaerdirektoratet for Aaret 1936. [**Report of the Veterinary Directorate for the Year 1936**]. [HANSEN, P.] pp. 251. Numerous tables, 1 map. Copenhagen: Johansens Bogtrykkeri. [Svo].

**ANTHRAX** was diagnosed in 31 herds, in which 37 head of cattle were infected, and 18 died. 1,138 animals infected with **TUBERCULOSIS** of the uterus or udder were slaughtered in accordance with the law. In 1936, a total of 30,250 herds were tuberculin-tested, and under the state control scheme, tests were performed on 16,844 herds containing 339,562 animals, and the owners were obliged to isolate the reacting animals. “Collective tests” supported by the state were made in 2,113 herds in 39 dairying districts; 98.4% of these herds were free from reactors, and only 0.2% of the animals reacted. In 197 dairying districts, with 22,504 herds and 271,816 animals, reactors were found in 21.2% of the herds, and amounted to 7.5% of all the animals tested. The state paid 1,226,350 Kr. 78 Ore for the slaughter of 20,160 reactors. At the end of 1936, 1,330 poultry breeding farms were certified as free from **BACILLARY WHITE DIARRHOEA** and **FOWL TYPHOID**. Infection was diagnosed by bacteriological and serological tests on 58 farms, and in chicks from 184 uncertified farms. 1,183,146 blood samples from 4,493 flocks were examined, and samples from 819 flocks were positive.

**FOOT ROT** in sheep (spoken of in the report as malignant foot rot) was combated by slaughter of the affected herds. From 1934 to 1936, 103 herds, comprising 2,365 animals, were slaughtered in the south-western districts of Jutland. The slaughter and compensation policy was found to be the best way of controlling this disease.

**FOOT AND MOUTH DISEASE** was found in five herds in January, 1936. These herds were slaughtered, and no further outbreak occurred until February, 1937, when one herd became infected and was slaughtered. Again the country was free until August, 1937, when a single herd became infected and was slaughtered; in October another herd became infected and was slaughtered. The last two outbreaks are regarded as the first of a series originating in the big outbreak which began in France in the spring of 1937.

Ox warbles were found in 0.07% of the herds on the islands and in 23.3% in Jutland. Some progress has been made in the campaign against the parasite.

Details of other infectious and parasitic diseases are given, and also an account of the laws, regulations and orders which are of importance for veterinary work.

—H. C. BENDIXEN (COPENHAGEN).

**JANSEN, J.** (1938). Overzicht der onderzoeken van het uit de praktijk ingezonden ziektemateriaal in 1937. (O.a. beschrijving van “paratyphus” bij apen, caviae, kippenkuikens, volièrevogels, zilvervossen en waschbeeren). [**Report of Diagnostic Work for 1937, Institute for Parasitic and Infectious Diseases, Utrecht University**].—*Tijdschr. Diergeneesk.* 65. 435-447. 2 tables. [English, French and German summaries].

A summary is given of the material sent by practitioners and diagnosed by

the Institute. A case of paratyphoid in monkeys yielded a type of *S. typhi-murium* which did not ferment rhamnose. This type occurs frequently in ducks, and enquiry revealed that the monkeys had eaten duck eggs.

*S. enteritidis* var. *essen*, usually occurring in ducks, was isolated from a pullet, which came from a farm surrounded by duck-farms and on which duck-eggs were also sometimes hatched.

A strain of *S.t.-m.* was isolated from some waxwings (*Bombycilla garrulus*) which died in an aviary. This strain appeared to be the type with complete fermentation of carbohydrates. After disinfection of the aviary a second outbreak of paratyphoid occurred, caused by a recently purchased sea-gull (*Larus canus*) which died soon after arrival; after this a starling (*Sturnus vulgaris*) and a wry-neck (*Jynx torquilla*) died. This proved to be a different infection, because the types of cultivated *S.t.-m.* were rhamnose-negative (the so-called "duck-type"). It is pointed out that wild sea-gulls often visit duck farms. *S.e.* var. *dublin* was found in silver foxes and raccoons.

*Bacterium equirulis* was isolated from pus in a case of chronic funiculitis in an old horse. A very pathogenic pure culture of *Clostridium novyi* was cultivated from a pig's kidney.

DUTCH EAST INDIES, JAVA. (1937). Veeartsenijkundig Instituut Buitenzorg, Verslag over 1936. [Report of the Veterinary Institute Buitenzorg, Java, for 1936]. [HUBER, F. L.]—*Jversl. veeartsenijk. Inst., Buitenz.* 1936. pp. 67-105. 10 tables, 2 graphs.

Besides a record of the material received from practitioners and of the sera and vaccines provided by the Institute, the annual report contains valuable information on several parasitic and infectious diseases.

It was proved that the method of sending blood samples by means of a stick of plaster of Paris was the most satisfactory for ANTHRAX diagnosis; the g. pig was the most suitable test animal; when the material was not quite fresh, both cultural and animal experiments were necessary; Zeissler's glucose-blood agar plate is a valuable medium for this work.

A culture of *Pfeifferella mallei* that had been cultivated for ten years on a medium containing ox bile had become avirulent for g. pigs. Research work will be commenced with this strain on horses and small test animals.

The aggressive action of BLACKLEG formol vaccine was examined, and could only be demonstrated when the vaccine came into direct contact with the BLACKLEG organisms.

During observations lasting one year, no evidence was obtained of drug-fastness of *Tryp. evansi* to naganol.

STEPHANOFILARIASIS was observed in buffaloes, affecting the ears only; treatment with "Cooper's dip" gave good results.

Observations were made on various kinds of tuberculin; the synthetic tuberculin described by GLOVER gave the best results.—JAC. JENSEN (UTRECHT).

ITALY. (1937). Istituto zooprofilattico sperimentale delle Tre Venezie: Relazione per l'anno 1936. [Report of the Veterinary Research Institute at Padua for 1936]. [BARDELLI, P.] pp. 36. 3 tables. [4 refs.] Padua: Tipografia del Seminario. [4to].

ROUTINE WORK.—The report gives in tabular form:—(1) a list of the materials submitted to the Institute during the year for examination and report, and (2) a classified list of diseases diagnosed. In 6,758 cases out of 9,101, the result of

examination was negative. BRUCELLA INFECTION was found in one out of 12 samples of human blood submitted. There was much BRUCELLA INFECTION in cattle. In specimens from pigs, 34 cases of SWINE FEVER were diagnosed, and 25 outbreaks of FOOT AND MOUTH DISEASE were dealt with. Much work was done on fowl diseases.

Details are given of sera prepared and distributed, and it is claimed that good results have been obtained from prophylactic vaccination in outbreaks of FOOT AND MOUTH DISEASE. A special effort has been made to investigate and deal with sterility in cattle.

RESEARCH.—There is a general discussion on the incidence and method of spread of brucella infection and of trichomonas infection in cattle. Details are given of a contagious disease, diphtherio-croupous in nature, affecting one herd, but it subsided too rapidly to admit of complete investigation.—S. F. J. HODGMAN.

## BOOK REVIEWS

HEIDEGGER, E. [Dr Institut für Tierpathologie der Universität München]. (1937). Wurmatafeln zum Bestimmen der wichtigsten Haustierparasiten. [**Tables for the Identification of the Most Important Worm Parasites of Domestic Animals**]. pp. viii + 121. Stuttgart: Ferdinand Enke. 135 figs. [8vo] [RM. 8.20].

This book has been prepared for the use of those who have no special knowledge of helminthology, but who occasionally find it necessary to determine the species of worms found on P.M. examination, or of eggs or larvae of parasitic worms found in the faeces.

The first two parts of the book, which is divided into five parts, give a very brief account of methods commonly used for the examination of faeces for eggs and larvae, and for the collection and examination of adult worms. The third part gives diagrammatic representations of a trematode, cestode and nematode, showing the main structures. The fourth part, which comprises the greater portion of the book, gives a very sketchy key to the differentiation of the commoner helminth parasites of domestic animals. These are arranged according to hosts, the tables giving name, site and distribution, life-history, description (in a dozen words or so) and a drawing, usually of the egg or larvae of the worm. The fifth and final part gives a diagrammatic representation of seven types of life-history of parasitic worms.

All of the diagrams are clear and the book should serve its purpose very well.

—E. L. TAYLOR.

KOCH, W. [Dozent an der Universität München]. (1939). Hormone und Hormontherapie in der Tiermedizin. [**Hormones and Hormone Therapy in Veterinary Medicine**]. pp. viii + 83. 5 figs., 1 table. [4 refs.] Stuttgart: Ferdinand Enke. [8vo] [RM. 5.40].

An attempt is made in this book to describe the progress made so far in the development of our knowledge of hormone treatment in veterinary work.

In the first part the various hormones are briefly described and the method by which they control certain physiological processes is discussed. Here and there certain inconsistencies are noted, *e.g.*, the site of formation of oxytocin is (in a table) given as the intermediate lobe of the pituitary, and (in an illustration) the maximum concentration of gonadotropic hormone in mare serum is placed at the fifth month.

The second part deals with the various uses of hormones in veterinary practice. Sterility is dealt with at comparatively great length, and emphasis is thrown on the condition not only in the female, but also in the male. A table describing hormonal preparations in use includes only those manufactured by German firms, and omits any mention of the gonadotropic preparation from pregnancy mare serum, possibly the most useful of such preparations.

The book ends with a short description of methods of pregnancy diagnosis. There is no bibliography and no index.—J. M. ROBSON.

DELEANU, N. T. [Professeur à la Faculté de Pharmacie de Bucarest, Directeur du Laboratoire de Chimie analytique, Membre de l'Académie de Médecine et de l'Académie des Sciences de Bucarest], FABRE, R. [Professeur à la Faculté de Pharmacie de Paris, Directeur des Laboratoires de contrôle du Ministère de la Santé Publique et de l'Académie de Médecine de Paris, Pharmacien en Chef du Groupe hospitalier Necker-Enfants-Malades], & CONIVER, L. [Ancien Assistant à l'Université de Bucarest, Chimiste-Légiste Lauréat de la Faculté de Pharmacie de Nancy et de la Société des Amis de l'Université de Paris]. (1938). Index médico-pharmaceutique. [**Medico-Pharmaceutical Index**]. pp. xii + 756. Numerous tables. Paris: Masson et Cie. [8vo] [Fr. 150].

This is a revised reprinting in French of a book written by professors of the medical faculty at Bucarest University in 1927. Its purpose is to serve as a ready reference book for medical practitioners and chemists.

It contains twelve chapters:—introduction, poisoning, pharmacodynamics, chemotherapy, galenic drugs, pharmaceutical preparations, posological tables, opotherapy, serum and vaccine therapy, vitamins, physiotherapy and narcotics.

For veterinary workers the book is chiefly of value for reference on the nature of drugs and biological products which may be mentioned in French medical literature, and for general comparative purposes as between English and French *materia medica*. There is a detailed index, and the book is well printed and bound.

—J. E.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

---

Vol. 9.]

May, 1939.

[No. 5.]

---

DISEASES CAUSED BY BACTERIA AND FUNGI

KAARDE, J. (1937). Die Euterentzündungen der Kühe und deren Behandlung. [**Mastitis and its Treatment**].—*Ref. III Balti. Valsty. vet. Kongr. 1937*. pp. 40-57. 3 tables. [In German : Russian summary].

In Estonia various forms of mastitis amount to about 15% of the cattle diseases officially observed. Bacteria of the *coli-aerogenes* group are said to account for 58.23% of cases in Lithuania, 58.95% in Latvia, and 38.66% in Estonia. The other causal agents, in order of importance, are mastitis streptococci, micrococci, *Corynebact. pyogenes*, *Mycobact. tuberculosis*, and *Brucella abortus*. Streptococcic mastitis is wide-spread in Estonia. Examination of 146 cows on nine farms revealed a 26.7% infection with streptococci. TB. of the udder was observed in only 0.5% of slaughter cattle found to be tuberculous.

—A. PABIJANSKAS (KAUNAS).

EL-GHERIANY, M. G. (1938). La fréquence de la mammite streptococcique chez les bovins d'Egypte. [**Bovine Streptococcal Mastitis in Egypt**].—*Bull. Off. internat. Epis.* 16. 244-248. [5 refs.]

Mastitis is now being encountered in Egypt mainly due to importation of stock. Out of 305 cows examined by the leucocyte count and Hotis test, and bacteriologically, two were affected with streptococcal, and two with staphylococcal mastitis. No cases were found among 294 buffaloes.—P. S. WATTS.

LESBOUYRIES, & BERTHELON. (1938). Mammite staphylococcique de la chienne. [**Staphylococcal Mastitis in the Bitch**].—*Rec. Méd. vét.* 114. 610-615. 2 tables.

The symptoms and lesions of the disease are described. They are those typical of gangrenous mastitis. Death may occur in 2-5 days, or after sequestration of the affected part recovery may occur. A chronic condition is also observed. Diagnosis can easily be made clinically or bacteriologically.

Treatment with sulphamide derivatives is said to have been successful in less acute cases. Local treatment is also necessary.

A comparison is made between the staphylococcus isolated from the disease in the bitch, and the organism of NOCARD from the disease in goats. NOCARD's

strain is the more toxic. Cross-immunity experiments indicated the close relationship of the two strains.—F. H. MANLEY.

BEUMER, J. (1938). L'action du sérum de cheval normal sur la staphylotoxine. [**Effect of Normal Horse Serum on Staphylococcus Toxin**].—*Ann. Inst. Pasteur*. 61. 54-71. [15 refs.]

B. studied the inhibitory power of horse serum on the production of staphylococcus toxin. It was found that horse serum incorporated in the medium only had an inhibitory effect on the toxin production of certain strains. Strains of staphylococci which were able to produce toxin in the presence of horse serum were also proteolytic, and he suggests that this proteolytic power denatures the protein, rendering it inactive.

No actual protective action by horse serum, such as by coating the red blood corpuscles, could be demonstrated in haemolysin tests. B. regards the fact that this inhibitory action could be shown against the haemolysin, leucocidin and cytotoxin of susceptible strains as further evidence that these effects are only different aspects of the same toxin.—D. L. HUGHES.

LE GENTIL, P. (1938). Action comparée du pouvoir immunisant de l'antivirus et de l'anatoxine staphylococcique administrés par différentes voies. [**Comparative Immunizing Powers of Staphylococcal Antivirus and Anatoxin Administered by Various Routes**].—*Thesis, Alfort*. pp. 95. 10 figs. [Numerous refs.]

After a review of the preparation, properties and uses of staphylococcal anatoxin and antivirus, the author describes experiments on the immunizing power of these preparations, using a very virulent strain of *Staphylococcus aureus* as test organism. The strain was first titrated for pathogenic power by several intradermal injections of graded dilutions of a 24-hour peptone broth culture. Several pairs of rabbits were then inoculated by various routes at weekly intervals with four separate immunizing agents:—a French anatoxin, an American toxoid, a stock antivirus and an autogenous antivirus. The first two conferred a general and local immunity and the last two a local immunity only.—R. O. MUIR.

RIEDMÜLLER, L. (1937). Einiges über den Milzbrand bei Mensch und Tier in der Schweiz. [**Anthrax in Man and Animals in Switzerland**].—*Schweiz. med. Wschr.* 18. 158-159. 1 fig., 2 tables. [4 refs.]

R. traces the history of anthrax in Switzerland from 1894. During the last ten years there have been fewer than 200 (usually not much above 100) cases of anthrax in animals annually, and there were only 15 cases of human anthrax over the whole of the same period. R. believes that animal anthrax in Switzerland is at present due in part to infection from imported foodstuffs.—J. E.

TABUSSO, M. E. (1938). Vacuna anticarbonosa glucosidada. [**Glucoside Anthrax Vaccine**]. pp. 19. [13 refs.] Lima, Peru: Ministerio de Fomento.

After a short review of different anthrax vaccines, T. reports the results obtained both in experimental and field conditions during eight years' work on glucoside anthrax vaccine. This vaccine is satisfactory when it is prepared with a 1% saponin solution, using attenuated anthrax bacilli. In cattle, goats, horses and sheep in highly infected areas receiving one inoculation with this vaccine, there was a considerable decrease in mortality from anthrax. T. asserts that the glucoside vaccine undoubtedly provides an effective and solid immunity for at least ten months.

ANON. (1937). Proyecto de reglamento contra el carbunclo bacteridiano. [**Proposed Regulations for the Control of Anthrax**].—*Bol. mens. Direcc. Ganad., Montevideo*. 21. 658-668.

By the principal clauses, owners, laboratories and medical authorities would be required to declare suspected cases. Visits would be made to infected premises and samples of suspected hides, etc., might be taken. In positive cases the premises would be isolated and all stock would be vaccinated, no animals being removed until 15 days after vaccination or after the last case of anthrax. Isolation would not be insisted on where the owner had declared that the existence of infection was suspected or had submitted material for examination. In this case the premises would be declared "infected", and 20 days allowed for vaccination of all susceptible animals. Animals for immediate slaughter would be allowed off the premises after veterinary inspection, and provided there had been no case of anthrax within the preceding ten days. Vaccination would be done by the official veterinarian, or under his supervision. The control of vaccines would be compulsory and a monthly declaration of sales, doses, etc., would be demanded from the manufacturers or retailers. Animals not vaccinated against anthrax would be excluded from dairy herds, and annual vaccination would be carried out in the summer months (September to April). Animals intended for entry into supervised dairy herds would be vaccinated at least 15 days before entry. Yearly vaccination of stock would be provided for, on premises declared infected or isolated, until three years had elapsed from the date of the original outbreak, and also the sampling of hides in hide cellars. Incineration and other methods of destruction of anthrax or suspected anthrax carcasses would be provided for, the skinning of such carcasses being forbidden.—A. H. HUNTER.

PIGOURY, L. (1938). Les suites immédiates de la vaccination anti-charbonneuse des équidés par le méthode intradermique en un temps. Etiologie et pathogénie des réactions vaccinales. [**Immediate Reactions in Intradermal Anti-Anthrax One-Dose Vaccination of Horses**].—*Rev. vét. milit.* 22. 158-161. 3 tables. [12 refs.]

Statistics are given of the vaccination of 63,000 army horses and mules in the Levant from 1928 to 1936. Inoculations were first performed with the Pasteur double vaccines. Later single-dose vaccines prepared respectively by the Pasteur Institute, Paris, and by the Morocco laboratory were given intradermally. The statistics illustrate a decreasing incidence of local and general reactions, as well as varying breed sensitivity to the Pasteur double vaccine. The total average proportion of severe reactions was approximately 0.1% with the Pasteur Institute single vaccine, and less than 0.3% with the Moroccan. The reactions, seldom more than a local oedema from the third to the 12th day, were much less frequent and serious than those due to the Pasteur double vaccine. Apart from racial sensitivity, the virulence of the vaccine determined the frequency and intensity of reaction. P. urges caution in the use of glucoside and lanoline vaccines.—R. O. MUIR.

- I. DAVIDSON, F. A. (1938). **Bovine Tuberculosis and the Value of Routine Herd Inspections**.—*Vet. Rec.* 50. 109-116. 1 appendix. [6 refs.]
- II. TORRANCE, H. L. (1938). **The Detection of the Cow Suffering from Udder Tuberculosis**.—*Ibid.* 116-119.
- III. ALLAN, H. B. (1938). **A Brief Survey of the Results of some Preliminary Tuberculin Tests in Dairy Herds**.—*Ibid.* 119-120.

I. D. points out that the great value of routine herd inspection is in the detection of the number of cases which come within the meaning of the Tuberculosis Order. In his opinion the samples of milk taken should be sent for biological

examination to the County Bacteriological Laboratory, since it interferes greatly with the veterinary inspector's work to spend time in the laboratory, owing to the hours at which milking is carried out at the farms. Samples should be taken soon after the cows have been milked, and not only from the affected quarter, but from the other quarter on the same side, or even from all four quarters.

He is of the opinion that the examination of bovine sputum, although providing a means of detecting infected cattle, is not of much importance in the detection of sources of infection directly responsible for human infection and that the infection of bulk samples of milk is not reduced to any appreciable extent by the slaughter of pulmonary cases of TB., but that the early removal of tuberculous mastitis cases does affect the number of TB.-infected samples found. Eradication can be carried out by rearing calves on non-infected milk and keeping them separated from the infected herd and using them as recruits to the breeding herd. The mere slaughter of cases of tuberculous mastitis does not materially affect the incidence of TB.

II. T. is of the opinion that the veterinary inspector should carry out the microscopic examination of milk as soon as possible after the sample is taken, but that the taking of individual samples should also be covered by the taking of bulk samples for g. pig inoculation test. In-calf "dry" cows should be included in herd inspection, which should take place four times a year.

III. This is a survey of "flying" herds, "mixed" herds and "breeding" herds in Durham.

In "flying" herds tested for the first time, an average of 42% were found to be reactors, varying from 18% in calves to 26-75% in adult dairy stock.

In "mixed" herds, comprising adult stock and young animals, the average percentage of reactors was 29.3; in the adult stock the highest was 54.8%. The average percentage of reactors in the adult cattle was 42.5.

In "breeding" herds, of which 18 were tested, the percentage of reactors was 3.6, although in one herd tested the percentage of reactors was as high as 26.1. The young stock and the first-calf heifers were practically free in all the herds.

A. is of the opinion that many clean herds could be found among "breeding" herds, if farmers would only decide to have the herds tested.—BRENNAN DEVINE.

KRAUSE, C. (1938). Ueber den Ablauf der Tuberkulose nach der Stadienlehre Rankes, ein geschichtlicher beurteilender Ueberblick in der Medizin. [**On the Development of TB. according to Ranke's Doctrine: A Critical Survey**]. —*Tierärztl. Rdsch.* 44. 485-494. [Numerous refs.]

This paper gives a general survey of the development of TB. in man, with particular reference to Ranke's doctrine of primary infection, generalization and isolated TB. of organs. There is nothing new in the article, but it does give a good account of the subject.—E. G. WHITE.

FÖLGER, A. F. (1938). Ueber einige bemerkenswerte tuberkulöse Primärkomplexe in Darmkanal von Rind und Schwein. [**Noteworthy Cases of TB. Primary Complexes in the Intestinal Canal of a Calf and Two Pigs**].—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 179-191. 6 figs. [6 refs.] [In German].

In the pig, primary TB. of the mesenteric lymph nodes is not usually accompanied by macroscopic lesions in the intestine. Two cases with extensive lesions in the intestine are described. The first was due to avian tubercle bacilli, and the Peyer's patches throughout the intestine were enlarged and firm, but showed no caseation or calcification. The second case was unusual in that tuberculous ulcers

were present in the intestine, and the mesenteric lymph vessels leading to the enlarged and caseated mesenteric lymph nodes were also tuberculous. The organism could not be typed, as the material had already been fixed.

In addition, a case of primary TB. of the intestine with ulceration followed by generalization is described in a calf. The animal had sucked a cow with tuberculous mastitis, and formed part of Bang's experiments on TB. in 1918.

—E. G. WHITE.

GRÄUB, E., & ZSCHOKKE, W. (1938). Experimentelle Untersuchungen über die tuberkulöse Reinfektion. [**Research on Tuberculous Reinfection**].—*Schweiz. Arch. Tierheilk.* 80. 289-297. 2 tables, 2 charts.

A series of six g. pigs were inoculated with each of the following vaccines :—antiphymatol—a dead vaccine [(1908). *Z. Tiermed.* 12. 81.], BCG and Friedmann's turtle bacillus, both avirulent, and a vaccine prepared from a strain causing slow progressive TB. in g. pigs. Two months later three of each series were inoculated with 0.0001 mg. of virulent TB., and three with 0.00001 mg. Controls were similarly treated. The results showed that no protection was conferred by the antiphymatol, that the avirulent vaccines merely delayed death, and that although the virulent vaccine prevented reinfection the animals finally died from the vaccine injection itself.—P. S. WATTS.

SCHMIDT, J., & MESSING, S. (1938). Lässt sich die Probe nach Triboulet zur Erkennung der Tier-Tuberkulose verwenden? [**Diagnosis of TB. by Triboulet's Test**].—*Berl. tierärztl. Wschr.* April 8th. 197-199. [10 refs.]

Triboulet's test for TB.—demonstration in the faeces of proteins said to be breakdown products of intestinal lesions—was applied to 124 animals of various species, as follows :—84 slaughtered for food, of which 48 showed some pathological abnormality; 10 slaughtered in emergency; 7 in a dying condition; 14 normal, and 9 sick animals. Sixteen in all gave a positive reaction, of which 11 showed no evidence of TB.; 108 gave a negative reaction, of which 21 were found to be infected with TB. The conclusion drawn is that this test is not of value for the diagnosis of TB.—P. S. WATTS.

PLUM, N. (1938). **Tuberculous Abortion in Cattle**.—*Acta path. microbiol. scand.* Suppl. No. 87. pp. 438-448. [9 refs.] [In English]. [Also appeared in *Skand. VetTidskr.* 28. 461-470].

From the examination of the placentas of several hundred cattle which had aborted, and from field observations, P. estimates that 1% of abortion in Denmark is tuberculous in origin. The bovine type of TB. is causing a decreasing, and the avian type an increasing proportion, a fact related to the gradual eradication of bovine TB. Experiments are described in which three tuberculosis-free pregnant cattle received cultures of avian type bacilli *per os*, and none aborted. Four pregnant cattle were injected intravenously with avian culture; three aborted after an average period of 100 days as a result of placental infection. P.M. examination revealed infection in the uterus only.—G. B. BROOK.

MONARI, D. (1938). Patogenesi e morfologia generale della infiammazione tubercolare nei mammiferi. [**The Pathogenesis of TB. in Mammals**].—*Clin. vet., Milano.* 61. 175-187.

M. gives a general account of the pathogenesis of TB. in the various domestic animals, with special reference to the theories of RANKE and of NIEBERLE.—J. A. N.

NIELSEN, F. W. (1988). Die Bekämpfung der Rindertuberkulose in Dänemark. [**Control of Bovine TB. in Denmark**].—*Dtsch. tierärztl. Wschr.* **46**. 513-515.

Eradication, based on Bang's system, was initiated 40 years ago in Denmark, when free tuberculin testing was made available. Dairy societies in lightly infected areas withheld from each farmer a sum of money which was returned if a herd was rendered free from TB. within five years. The government then authorized the compulsory testing of remaining herds in any area in which more than 90% of farms were free of infection, and many "free" areas were created. At the same time a fund was established to guarantee a price for reactors slaughtered in heavily or slightly infected herds in such areas, and this, with a communal isolation-rearing farm, ensured the progress of the campaign in Jutland. Statistics are submitted and information is given on the law concerning open TB. and pasteurization of dairy products.—G. B. BROOK.

- I. NIEBERLE, K. (1988). Zur vergleichenden Pathologie der Tuberkulose der Tiere. Tuberkulose bei der Giraffe. [**TB. in a Giraffe**].—*Arch. wiss. prakt. Tierheilk.* **73**. 184-198. 2 figs.
- II. SCHMIDT, H. W. (1988). Bildet die Tuberkulose eine ernste Gefahr für unseren Rehwildstand? [**Does TB. Constitute a Grave Danger for Wild Deer?**].—*Berl. tierärztl. Wschr.* Feb. 4th. 64-65. 1 fig. [Numerous refs.]
- III. SCHMIDT, H. W. (1988). Anzeichen für Tuberkulose beim Reh. [**Signs of TB. in Roe Deer**].—*Berl. Münch. tierärztl. Wschr.* July 29th. 449-450. 1 fig.

I. A report of TB. in a giraffe, believed to have been about 11 years old, which died after showing respiratory symptoms for a short period. The lesions comprised pulmonary TB. with numerous bronchiectatic cavities, secondary tuberculous intestinal ulceration, and miliary TB. of the liver and spleen. Caseation and calcification were not found in the lesions, which were essentially productive in character. The organism was of the bovine type.

II. After a brief review of the recorded cases of TB. in wild deer, S. describes a case which was accompanied by a faulty development of the antlers—particularly of the burrs—in comparison with those of a normal animal of the same age and size. It is suggested that further observations might be made on a possible relationship between the presence of TB. and retarded antler development.

III. It is stressed that deer in advanced stages of TB. may show no evidence of emaciation which only occurs during the few days preceding death. It would appear that 12 cases of spontaneous TB. of wild deer have been recorded, the first being in 1914 and the last by S. in 1988 [see II, above].—E. G. WHITE.

REMETE, T. (1937). Ueber die Rolle des Geflügeltuberkulosebazillus bei der Tuberkulose der Harn- und Geschlechtsorgane des Menschen. [**Avian Type Infection in Genito-Urinary TB. in Man**].—*Z. urol. Chir.* **43**. 202-207. [Numerous refs.] [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **45**. 585].

R. examined 42 cases of renal TB. in man, testing the patients with old tuberculin and avian tuberculin and inoculating kidney tissue into fowls. Six reactions to avian tuberculin resulted, but the inoculation tests were all negative.—J. E.

- I. ROCHER, H. L., & LAPORTE, R. (1988). Rôle du bacille tuberculeux bovin dans les tuberculoses externes. [**Role of Bovine Type Tubercle Bacilli in TB. in Man**].—*C. R. Soc. Biol. Paris.* **127**. 266-268. [1 ref.]

- II. SAENZ, A. (1938). Rôle de l'infection bacillaire d'origine bovine dans la tuberculose de l'enfant et de l'adulte. [**Role of Bovine Type Bacilli in TB. in Children and Adults**].—*Ibid.* 269-272. [2 refs.]
- III. SAENZ, A., & FATIO, D. M. (1938). Étude étiologique et bactériologique de deux cas de synovite tuberculeuse à bacille bovin. [**Two Human Cases of Tuberculous Synovitis caused by Bovine Type Tubercle Bacilli**].—*Ibid.* 1418-1421. [3 refs.]

I. The authors report the results of an enquiry into the incidence of bovine tubercle bacilli in human infections. In only two cases, both with lesions in cervical lymph nodes, out of 89 were they able to identify a bovine strain.

II. Bovine type bacilli were isolated in only 26 out of 1,199 cases of TB. of various kinds. S. concludes that the incidence of bovine type infection in France is lower than that in Great Britain and Denmark.

III. Cultivation of material from the lesions on the hands of butchers, both of whom had received cuts while handling bovine carcasses, proved the organism implicated to be a bovine type bacillus.

- I. POTTER, T. S. (1937). **Survival of Oxygen and Water Deprival by Tubercle Bacilli**.—*J. infect. Dis.* 60. 88-93. [Numerous refs.]
- II. CARVALHO, A., & VIDAL, C. (1937). Le pH et la culture du bacille tuberculeux. [**The Importance of the pH of the Medium in the Cultivation of Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* 126. 588-589.

I. Avian tubercle bacilli were subjected to the severest possible deprival of water and oxygen, with a result interesting in that it upset the usual conception of the action of desiccation on the tubercle bacillus. In the first experiments organisms survived for 14 months and two years, in the second for 12 months. Theoretically no oxygen or water could have been present in preparations submitted to the technique described.

II. Experiments are described in which tubercle bacilli were sown in liquid media and the pH determined at intervals during growth. There appeared to be no correlation between the type of organism and the initial and subsequent pH of the medium.—A. WILSON TAYLOR.

- DIETER, R. (1937). Zum Vorkommen der Paratuberkulose beim Schafe. [**Johne's Disease in Sheep**].—*Z. InfektKr. Haustiere.* 52. 70-78. 2 figs. [6 refs.]

The object of this paper is to present evidence of the occurrence of Johne's disease in sheep. Three clinical cases from a flock near Leipzig, in which losses from a disease resembling Johne's disease in cattle had been sustained, were observed for two months and examined carefully P.M. The lesions of the intestine closely resembled those of the bovine disease [see, however, *V. B.* 6. 207.], and acid-fast bacilli were present in abundance. [No cultural tests are mentioned].—J. E.

- BENDIXEN, H. C., & JEPSEN, A. (1938). Corynebact. equi (Magnusson, 1923) som Aarsag til tuberkulose lignende Suppurationsprocesser hos Svin, navnlig i Halslymfekirtler. [**Corynebact. equi (Magnusson, 1923) as the Cause of Processes Similar to TB. of the Cervical Lymph Nodes in Swine. Preliminary Report**].—*Medlemsbl. danske Dyrslaegeforen.* 21. 401-422. 5 figs. on 8 plates, 8 tables. [7 refs.] [German summary].

Type determination of tubercle bacilli from 81 cases of swine TB. gave a majority of bovine organisms from some areas, but in other areas the avian type was predominant. Among 19 cases sent in from an abattoir in Funen there was

one case of localized TB. of the cervical lymph nodes, caused by a human type bacillus; 12 cases of localized TB. and three of generalized TB. were caused by the avian type bacillus, and three cases of generalized TB. were caused by the bovine type.

During the examination of samples from two large pig farms where TB. was suspected, and of further samples sent in by bacon factories from pigs supposed to be infected, homogenized material was grown on Löwenstein's and on Besredka's nutrient media; in 12 cases a growth was obtained of a Gram-positive organism which in its morphological, cultural and pathogenic characters corresponded to *Corynebact. equi* described by MAGNUSSON in 1928. The corynebacterium found by the authors was cultivated from the cervical lymph nodes in pigs with the tuberculous lesions usually described as "localized TB. of the cervical lymph nodes". The authors conclude that it is identical with the coccobacillus found by HOLTH and AMUNDSEN in 1936 [*V. B.* 7. 54.]; in Denmark PLUM (1938) and JESPERSEN (1938), have independently of each other proved the frequency of lesions containing this coccobacillus (also called the "Holth-bacillus"). The homogenization technique used by the authors to a great extent destroys the corynebacteria in the original material; they obtained better results by the usual method of sowing direct from infected material into melted agar. As a rule this gives ample growth after a period of 36-48 hours.

As in the case of udder corynebacteria, the organisms here dealt with are not infrequently acid-fast in the original material, but microscopic examination showed acid-fast coccoid organisms in only about a third of the cases from which corynebacteria could be cultivated. In pus from horses and g. pigs inoculated with pure culture of *Corynebact. equi* the authors found coccoid acid-fast organisms similar to those found in the spontaneous lesions in pigs.

A series of experiments carried out by the authors showed that this corynebacterium was pathogenic for young pigs. If they are fed pure culture, lesions occur with great regularity, especially in the respiratory organs. The disease usually takes the form of subacute or chronic pneumonia, necrosis, and the formation of abscesses; nodules may occur on and in the lungs, and to the naked eye they are very like those found in TB. The bacteria regularly pass through the mucous membrane of the throat; weeks after feeding the organisms they may be cultivated from the submaxillary lymph nodes, where they live and multiply. Subcutaneous inoculation of the organism is regularly followed by the formation of abscesses in the regional lymph nodes as well as at the site of inoculation. In view of these observations, the authors suggest that *Corynebact. equi*, besides causing small lesions in the cervical lymph nodes of the pig, may also play some part in causing diseases of the respiratory organs in pigs.

CAUDRON, M. F. (1936). Le rouget du mouton. [*Erysipelothrix rhusiopathiae* Infection in Sheep].—*Thesis, Alfort*. pp. 108. 4 figs., 5 tables, 14 graphs. [Numerous refs.]

The chief form of the disease in sheep is polyarthritis, and it is pointed out that the name "rouget" is incorrect, as no erythema is observed in affected sheep. The history of appearance of cases in various countries is traced. The organism is stated to have lost much of its virulence for pigs after passages through sheep. A somewhat detailed description is given of the form of disease produced by *E. r.* in horses, oxen, sheep, pigs, birds, rodents and human beings.

Infection of sheep is considered by the author to be *via* the umbilicus from infected soil. Methods of immunization and prevention are discussed.—H. B.

NELSON, J. B. (1938). **Studies of an Uncomplicated Coryza of the Domestic Fowl. IX. The Co-Operative Action of Hemophilus gallinarum and the Coccobacilliform Bodies in the Coryza of Rapid Onset and Long Duration.**—*J. exp. Med.* 67. 847-855. 2 tables. [5 refs.] [See also *V. B.* 7. 519].

N. found that the exudate from cases of coryza of rapid onset and long duration (Type III) contained *H.g.* and coccobacilliform bodies, and that both could be demonstrated throughout the course of the disease. Infection with coccobacilliform bodies did not usually cause any reaction until 2-3 weeks later, and organisms were seldom demonstrable before the tenth day (Type II coryza). Infection with pure cultures of *H.g.* gave rise to a coryza of rapid onset and short duration (Type I coryza). The organism seldom persisted in the host for more than two weeks, and frequently died earlier. When the two agents were combined, a coryza of rapid onset and long duration resulted. The rapidly multiplying *H.g.* created a favourable environment for the development of coccobacilliform bodies, which were demonstrable from the first day, and the presence of the bodies appeared to prolong the residence in the host of *H.g.* The effect of the combination indicated that a true symbiotic reaction had taken place.—J. E. WILSON.

- I. JACOTOT, H. (1938). Sur la prophylaxie sérique de la pasteurellose des boeufs et des buffles. [**Serum Prophylaxis of Pasteurella Infection in Cattle and Buffaloes**].—*Bull. Acad. vét. Fr.* 11. 246-249. [2 refs.]
- II. JACOTOT, H. (1938). Accidents chez les boeufs employés à la préparation du sérum contre la pasteurellose bovo-bubaline. [**Deaths in Cattle Used for the Production of Serum against Bovine Pasteurellosis**].—*Ibid.* 250-254. [1 ref.]
- III. DELPY, L., & RASTEGAR, R. (1938). Sur un nouveau vaccin contre la septicémie hémorragique des bovidés et le barbone des buffles (pasteurelloses). [**A New Vaccine against Pasteurellosis in Cattle and Buffaloes**].—*Rev. Immunol.* 4. 322-339. 13 tables. [Part of the work was also reported in *Bull. Acad. vét. Fr.* 11. 256-258].

I. It is stated that an effective serum for the preventive and curative treatment of the less acute forms of haemorrhagic septicaemia of bovines can easily be produced by hyperimmunization of cattle, and such a serum has for many years been in use in Indochina.

A number of controlled experiments were performed on calves and rabbits to ascertain the efficiency of antiserum against artificial infection; 10 c.c. and 20 c.c. doses protected calves against subsequent inoculation of virulent culture which killed all controls in less than 36 hours. Inoculation of serum at the same time as virulent culture prevented fatal results if given in doses of 20 c.c., and sometimes in doses as low as 4 c.c. Inoculation of 30 c.c. of serum six hours after infection and 25 c.c. 12 hours after infection caused recovery. Rabbits inoculated with 0.5 c.c. serum at the same time as virulent culture were protected, and only one out of three rabbits succumbed after being inoculated, six hours after infection, with 1.5 c.c. intravenously and 5 c.c. subcutaneously.

II. Of 95 cattle employed over a period of 12 years for the manufacture of H.S. antiserum, seven which had long been receiving periodical inoculations of pasteurella succumbed after a routine inoculation. Some of these died rapidly from an acute attack, others after showing symptoms for several days. In the latter case the pasteurella recovered were found to be of low virulence, or even avirulent. An endotoxin is believed to have been responsible for the mortality resulting from such infections of low virulence.

III. With the intention of investigating various methods of vaccination against bovine pasteurellosis, one strain of *pasteurella* from cattle and two from buffaloes were isolated and examined. All were highly pathogenic, and bacteriologically there was little difference between them. Antigens composed of formolized and heat-killed bacteria gave little or no protection against subsequent inoculation with virulent culture, in a selected test dose of some 800,000 organisms, which killed controls in 24-36 hours. Experiments with natural aggrassin were also unsuccessful. Attenuated organisms were prepared:—(1) by prolonged growth in the incubator and at room temperature, and (2) by growth in filtered oedema obtained from local lesions in calves experimentally killed by *pasteurella*. The attenuation was not marked, and although a safe dosage produced some immunity it did not protect against five times the selected lethal test dose. *Pasteurella* incorporated with olive oil, or 80 % lanoline plus olive oil, were tested on a number of calves. In a dose equal to one M.L.D. of the pure culture no reaction followed, but neither was there any immunity to five times the test dose, and vaccination with a quantity equal to four test doses caused death in 2-4 days. It was also found that *pasteurella* in oil or lanoline died in less than 48 hours. Mixed with 5 % saponin (Poulenc brand), more than one lethal test dose proved fatal, though one dose produced immunity if inoculated into the caudal fold. If *pasteurella* were added to 5 % saponin, lysis occurred and in 24 hours the fluid became progressively clear and was sterile. Calves inoculated with 2 c.c. of this fluid containing 500 times the lysed organisms in a test dose proved immune to 50 times the usual test dose. A moderate reaction followed the inoculation of this vaccine. A filtrate of the fluid also immunized, but to a lesser extent, and this is probably due to some absorption by the filter candle.—S. J. GILBERT.

KAIRIES, A., & TARTLER, G. (1937). Die Brauchbarkeit der Kochblutagarplatte zum Nachweis von Pasteurellen bei Hasen und Kaninchen. Mit einem Beitrag über allgemeine und obligate Hämoglobinophilie bakterieller Influenzaerreger. [The Use of the Blood Agar Plate in the Demonstration of Pasteurellosis in Hares and Rabbits, with a Note on Haemoglobophilic Influenza Bacteria].—*Zlb. Bakt. I. (Orig.)*. 140. 36-47. 2 figs. [Num. refs.]

The authors examined smears from the throat and pharynx of shot wild hares and rabbits, and found it very easy, in the majority of cases, to cultivate *pasteurella*-like organisms which closely resembled *Haemophilus influenzae* from human beings. They state that when ferrets are artificially infected with human strains of the influenza virus, they are prone to develop symptoms of specific animal influenza that may actually be due to pre-existing infection with such a haemophilic organism.

Organisms cultivated from rabbits had affinities with the human influenza bacillus and the *Pasteurella* of ferrets [*V. B.* 8. 269]. These rabbit organisms agglutinated *Past. leptiseptica*. The authors state that the property of requiring the special growth constituents necessary for the members of the haemophilic group is not of value as a means of differentiating between the *Haemophilus* and *Pasteurella* groups. They confirm SEIFRIED's opinion [*V. B.* 7. 309.] that most of the pulmonary affections of rabbits are brought about by *pasteurella*-influenza forms.—M. F. BENJAMIN.

DI AICHELBURG, U. (1937). Sul potere batteriostatico in vitro di alcune sostanze coloranti per i germi del gruppo salmonella. [Bacteriostatic Action of some Dyes on Salmonella].—*G. Batt. Immun.* 19. 821-886. 8 tables. [Numerous refs.] [English, French and German summaries].

Of 15 dyes, belonging to the groups triphenylmethane, thiazine, acridin, and azo-compounds, tested by the author, only malachite green, brilliant green, methyl green, pyronin, and trypaflavine had any bactericidal action *in vitro* on 15 different strains of salmonella, including *S. paratyphi* A, B, and C, *S. enteritidis* Gärtner, *S. typhi-murium*, and *S. suispestifer*, and the actions shown were slight; the addition of serum to the liquid medium increased the bactericidal effect of trypaflavine, but either decreased or else did not affect that of the remaining dyes. All the strains tested were more sensitive in the R than in the S stage of dissociation. The differences noted in the reaction of the various strains to the dyes are not regarded as characteristic of these types.

MEISSNER, H. (1938). Zur pathologischen Anatomie und Histologie des Schweineparatyphus. [**Pathology and Histology of Swine Paratyphoid**].—*Z. InfektKr. Haustiere*. **53**. 180-200. 7 figs.

Between September, 1935, and October, 1937, *Salmonella cholerae-suis* was isolated 12 times from pigs at the Berlin abattoir. The pathological and histological changes corresponded to those of typhoid and paratyphoid infection in man and to those of bovine paratyphoid. Miliary necrosis occurred in the liver and spleen; endophlebitis was found in internal organs. This infection in pigs is clearly defined. The typical miliary necrosis is easily overlooked and it is therefore desirable that the veterinarian should use a hand lens during meat inspection.

—JAC. JANSEN (UTRECHT).

SANTAGOSTINO, C. (1937). Il paratifo acuto setticemico dei suini. [**Acute Paratyphoid Septicaemia in Swine**].—*Clin. vet., Milano*. **60**. 77-88. [13 refs.]

Acute septicaemia caused by a highly virulent strain of *Salmonella cholerae-suis* was observed in a stock of about 850 swine. In three weeks, 60 adult animals died, and the mortality of the younger animals reached 80%, death occurring after 3-4 days. Badly prepared food was believed to have caused an initial digestive disturbance, which may have paved the way for the paratyphoid infection. Neutralizing the acidity of the skim milk fed to the pigs, and treatment of the healthy animals with a specific vaccine, yielded good results.

—HANS GRAF (ZÜRICH).

ROEMMELE, O. (1938). Paratyphus-B-Schottmüllerinfektion verursacht seuchenhaftes Verlammen. [**Infectious Abortion of Sheep caused by *Salmonella paratyphi* B**].—*Z. Fleisch- u. Milchhyg.* **48**. 403-405.

A ewe on the point of aborting, from a farm on which abortion had been occurring, was slaughtered and examined bacteriologically, and *S. paratyphi* B was cultivated from visceral organs. From the blood of a living sheep that had just aborted, *S. paratyphi* B was also isolated, and agglutinins were demonstrated in its serum. A second investigation on the farm four weeks later gave negative results; the serum titres had decreased and the infection was considered to have died out. It became known later that, a few months before the sheep aborted, the children on a neighbouring farm had been ill with *S. paratyphi* B infection. It is suggested that the infection came from this source, the bad winter fodder predisposing the animals to the disease, which abated after they were put out to pasture.—JAC. JANSEN (UTRECHT).

I. MACCOLINI, R. (1938). Sur l'immunité conférée par des injections de bacilles paratyphiques morts ou vivants, incorporés dans la lanoline. [**Immunity Conferred by Injections of Dead or Living Paratyphoid Bacilli**]

**Embedded in Lanoline].—***Rev. Immunol.* 4. 340-358. 3 figs., 5 tables. [3 refs.]

- II. NÉLIS, P. (1938). La production des agglutinines spécifiques chez les lapins injectés au moyen de bacilles paratyphiques enrobés dans un mélange vaseline-lanoline. [**Immunization against Paratyphoid in Rabbits by Means of Vaseline-Lanoline Antigens**].—*C. R. Soc. Biol. Paris.* 127. 487-488. [3 refs.]

I. Six groups of four rabbits each were vaccinated with four increasing doses of heat-killed *Salmonella typhi-murium* at weekly intervals, as follows :—groups 1, 3, 5 and 6 with saline suspensions, injected subcutaneously, intraperitoneally and intravenously, and groups 2 and 4 with suspensions in a lanoline plus olive oil mixture (subcut. and intraperit.). Three further groups of four rabbits each were vaccinated with three doses of live bacilli at intervals of 15 days for two groups, and of seven days for the last group, as follows :—group 8 with saline suspension (subcut.), and groups 7 and 9 with small and large doses of suspension in lanoline plus olive oil mixture (subcut.). Results of precipitation and agglutination tests with the sera of the nine groups against somatic and flagellar antigens of *S.t.-m.* are tabulated, and three graphs illustrate the rate of production of precipitins and somatic and flagellar agglutinins in the first six groups. The resistance of each group to infection with graded doses of virulent bacilli, was virtually the same.

II. The vaccination of four groups of four rabbits each against *S. paratyphi B* placed the vaccines in the following order of decreasing efficiency :—live emulsion in vaseline-lanoline (subcut.); heat-killed saline emulsion, diluted 1 in 10, subdurally; heat-killed emulsion in vaseline-lanoline (subcut.), and heat-killed emulsion (subcut.). The first of the above vaccines induced immunity without infection, while the second caused a meningeal reaction.—R. O. MUIR.

TOBA, A. (1937). **Chemical and Immunological Study of Bacterial Constituents.** (II).—*J. Jap. Soc. vet. Sci.* 16. 358-383 of pt. 1. 1 table, 1 graph, 1 chart. [Numerous refs.] [In Japanese: abst. from English summary pp. 44-48 of pt. 2].

T. studied the composition of *Salmonella typhi-murium* from a purely chemical standpoint. He reports the isolation of various alcohol-soluble and alcohol-insoluble fractions, but no indication of the antigenic construction of these components is given.—R. E. GLOVER.

THOMSEN, A. (1938). **Contributions to Elucidation of the Question about the Frequency of Infectious Abortion in Cattle and its Combating in Denmark.** (Fejo 1936—Bornholm 1937).—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 533-543. 1 table. [7 refs.] [In English].

Clinical experience indicates that some 10 per cent. of the cattle in Denmark are infected with contagious abortion. Very little is known of the extent of infection as shown by blood testing, but control by testing was commenced on the island of Fejo in 1936 and on Bornholm about a year later. On Fejo, only 11 herds were found infected out of 100 herds comprising 1,087 cattle. In the positive herds, 52% of the cattle were reactors. Routine testing and isolation were practised, and at the end of 12 months 98% of the herds were free of infection. 3,705 herds, comprising 37,897 cattle, were tested on Bornholm, and 1,227 herds, containing 5,537 reactors, were found to be infected. Control measures were put into operation, but considerable difficulty was experienced in inducing sufficient farmers to co-operate. After 15 months of testing on this island, 88 herds were cleared of infection.—S. J. GILBERT.

WACKERBARTH, G. (1937). Ist bei Brucellose-kranken Kühen der nichttrüchtige Uterus Sitz der Erreger? [**Is the Non-Pregnant Uterus of Cows with Brucellosis the Seat of Infection?**].—*Inaug. Diss., Hanover*. pp. 93. [16 refs.]

Three hundred animals were examined serologically and the percentage of infection in three different areas varied from 14.7 to 25.6. Twenty-two uteri from non-pregnant cows with a titre of over 500 were examined. No macroscopical evidence of infection was found in 17 cases; pyometra was found in two, and glandular enlargements in three. In nine cases, histological findings were abnormal, and these are detailed together with the methods of staining. Neither culturally nor by animal inoculation could *Br. abortus* be demonstrated in any instance.

—P. S. WATTS.

LOBEL, L. W. M., VAN DER SCHAAF, A., & ROZA, M. (1938). Smetstofdragers van *Brucella abortus* bij runderen in het district Grati van het regentschap Pasoeroean. [**Carriers of *Br. a.* in Cattle in the Grati District of the Pasoeroean Department, Java**].—*Ned.-ind. Bl. Diergeneesk.* 50. 188-199. [11 refs.] [English summary].

Of 2,078 head of cattle examined serologically in Grati for *Br. a.* infection, 12 were positive, and four of these 12 were killed and cultures made from them. G. pigs were inoculated with tissue suspensions, and in three out of the four cases *Br. a.* was isolated; in two cases, cultures were grown from cutaneous worm nodules. It is suggested, therefore, that the examination of worm nodules (*Onchocerca gibsoni*) of suspected animals is important.—JAC. JANSEN (UTRECHT).

DELBE, P. (1935). La brucellose des équidés. Etude clinique et expérimentale. [**Brucella Infection in Horses**].—*Thesis, Alfort*. pp. 95. 1 graph. [Numerous refs.]

A study of brucellosis in equines in which numerous clinical observations are interpolated. Attempts to reproduce the clinical disease experimentally were unsuccessful, and local abscess formation is believed to have been due to pre-existing lesions of *Onchocerca* in many cases. Reactions to the agglutination test were found to vary in titre in the case of various strains from equine and bovine sources, and several tests should be made of blood of a suspected animal before it is declared negative. Ophthalmic and intradermal reactions were found to give accurate results in infected animals. One case of brucellosis in a donkey is described.—S. J. GILBERT.

VERŠILOVA, P., PAVLOV, P., & NESGOVOROV, B. (1937). Epidemiologija brucelleza na Južnom Urale. [**Epidemiology of Brucellosis in the South Urals**].—*Brucellosis in Sheep*. pp. 428-434. 6 tables. Moscow: Viem Publ. Dept.

A Commission of specialists were delegated in 1932 to investigate the epidemiology of human brucellosis in the South Urals region of the U.S.S.R. It is stated that they established a direct relationship between the spread of brucella infection among the sheep, goats, cattle, and pigs on the farms and the incidence among the personnel coming into direct contact with the animals. Infection was especially rife (46.4%) among the milkers and shepherds, both men and women, but only amounted to 15.7% among the hands in general charge of small units of cows. From 7.6% to 18.6% infection was found among the workers in meat-preserving or meat-curing factories, indicating that it may be spread by the carcasses of infected animals. In general, in the region examined, brucella infection is definitely an occupational disease; both sexes seemed equally susceptible, irrespec-

tive of age, except that persons under 15 and over 50 were rarely employed in these occupations. A high percentage of the infected persons were acutely affected.

The agglutination reaction was on the whole quite reliable for diagnosing human brucellosis; the melitin test was superior, however, in that it gave positive reactions in 18% of the cases which had either reacted negatively to the aggl. test or given negative blood cultures. Since the melitin test has not yet been sufficiently studied, it is recommended that both methods should be used concurrently for diagnostic purposes.

SOLOVJEV, A. (1937). *Materialy k histopatologii eksperimentaljnogo brucelleza ovec*. [The Histopathological Changes in Experimental Brucellosis in Sheep].—*Brucellosis in Sheep*. pp. 117-128. 9 figs. [15 refs.] Moscow: Viem Publ. Dept.

Four rams and 20 ewes received subcutaneous injections of from  $5 \times 10^6$  to  $4 \times 10^9$  organisms of the M2 strain (non-virulent) of *Br. melitensis* and also from  $10^9$  to  $5 \times 10^9$  of the M5 (virulent) strain, two other ewes were infected by two peroral doses  $2 \times 10^{10}$  and  $4 \times 10^{10}$  of the M5 strain, and seven ewes were immunized either with a "vaccine" or by injections of the non-virulent M2 strain; following this, some were infected with  $10^9$  organisms of the virulent M5 strain. The animals were killed at intervals of 2-30 weeks after infection and histological examinations of the organs were made. T. describes the histological changes he observed in the liver, spleen, kidneys, adrenal glands, lungs, heart, bone-marrow, uterus, udder, and certain lymph nodes.

In the lymph nodes there was hyperplasia of the reticulo-endothelium with the formation in certain cases of small clumps of reticulo-endothelial and of giant cells, reduction of the lymphoid elements, and numerous plasma cells in the medulla. In the liver there was hyperplasia of Kupfer's cells, formation of intra-acinous foci, and infiltration of lymphoid elements into the periportal tissues. In the spleen there was hyperaemia of the pulp, with deposition of haemosiderin in a number of cases and, in isolated cases, the formation of small foci of reticular hyperplasia. In the adrenal glands there was wide-spread necrosis of the cells in the reticular zone of the cortex. The other changes observed, in particular the formation of suppurating foci in the adrenal glands, in the liver and in the mammary gland, were so few in number that it was not possible to relate them to brucella infection.

It is pointed out that, while this investigation throws some light on the histological changes caused by brucellosis in sheep, the number of animals observed was limited. Moreover, no observations were made on the changes brought about by infection in certain other systems, e.g. the nervous system, which clinical observations show definitely to be affected by the disease.

- I. DUBOIS, C. (1938). Innocuité, chez la brebis, la chèvre et la vache, du vaccin préparé avec des germes vivants avirulents, de *Brucella abortus suis*, en émulsion dans un excipient irrésorbable. [Harmlessness for Sheep, Goats and Cattle of a Vaccine of Living Avirulent *Br. suis* in an Unabsorbable Excipient].—*Bull. Acad. vét. Fr.* 11. 42-51. [8 refs.] [Also appeared in *Arch. internat. Brucelloses*. 1. 90-99].
- II. DUBOIS, C. (1938). II. Le vaccin en excipient irrésorbable préparé avec des germes vivants, avirulents, de *Brucella abortus suis*, paraît susceptible de préserver de la brucellose, la brebis, la chèvre et la vache, indemnes de cette maladie. [Immunizing Value for Ewes, Goats and Cows of Live, Avirulent *Br. suis* in a Non-Absorbable Excipient].—*Ibid.* 219-238. 1 table. [8 refs.]

I. D. first recounts his experiments with a vaccine of living avirulent *Br.s.* combined with lycopodium powder in a vaseline or lanoline base. During the years 1936-1938 inclusive, some 20,000 animals (7,600 cows, 12,800 sheep and 200 goats) widely distributed throughout France were vaccinated, all but a few hundred being healthy animals in a contaminated environment. The chief object of the work was to premunize susceptible animals and to prevent abortion among those already infected. This article details the experiments designed to test any adverse results of the treatment for both purposes.

More than half the inoculated animals were pregnant, some being within two or three weeks of term; others were tested with 5-6 times the usual dose; in no case was parturition abnormal.

The same strain of *Br.s.* was also used for a saline suspended vaccine on more than 100,000 animals without any case of undulant fever being noted in the attendants, although numerous cases had been recorded previously. No spread of infection to non-premunitized animals from long contact with premunitized healthy animals was noted.

Sheep, cattle and g. pigs were tested by haemoculture after this vaccination, with negative results. Agglutination reactions of g. pigs injected with blood and urine from these animals remained negative. The milk of two vaccinated ewes and one cow also remained free of vaccinal organisms, as revealed by g. pig tests.

II. D. details numerous field vaccination experiments with ewes, goats and cows in various regions of France. All the herds used were clinically free, or were first proved to be free, of brucella infection by serum or allergic tests, or both, and following vaccination some of them were placed under conditions which would normally have induced a proportion of brucellosis among them.

The vaccine used had previously been proved avirulent, even when inoculated during gestation, and it remains localized at the site of inoculation. Bacteraemia and elimination of bacteria through either the urine or the milk do not occur; it is claimed, therefore, that the vaccine is safe for contact animals and attendants. For ewes and goats a dose of 0.25-1 mg. and for cows 1-5 mg. of living *Br.s.* in a mixture of 90.5 parts vaseline, 9 parts lanoline, and 0.5 parts lycopodium powder was used in these trials. The local, serological and allergic reactions to the vaccine are all detailed. The practical duration of the immunity conferred appeared to be one year, and could not be assessed by the local nodular reaction, which did not vary. D. considers that cattle should be re-vaccinated as soon as the reaction to the allergic test diminishes.

All the vaccinated animals produced normal young at term, and no abortion occurred among them. A more extended field trial is proposed.—C. V. WATKINS.

- I. VIOLETTE, H. (1938). De la prophylaxie des brucelloses. [**Prophylaxis of Brucellosis**].—*Arch. internat. Brucelloses*. 1. 20-26. [English, German and Italian summaries].
- II. STOCKMAYER, H. W. (1938). Die Immunisierung im Dienste der Bekämpfung der Rinderbrucellose. [**The Use of Immunization in the Control of Bovine Brucellosis**].—*Ibid.* 82-89. [In German: English, French and Italian summaries].
- III. DUBOIS, C. (1938). III. Traitement de la brucellose animale par les germes vivants, avirulents, de *Brucella abortus suis*, en émulsion dans un excipient irrésorbable. (Résultats observés au cours de ces trois dernières années chez 17-692 ovins, 1-488 caprins et 4-287 bovins). [**Treatment of Animal Brucellosis with Living, Avirulent *Br. suis* Emulsified in an Unabsorbable Excipient**].—*Bull. Acad. vét. Fr.* 11. 388-404. 6 tables. [6 refs.]

IV. KRESS, F. (1988). Ergebnisse der Untersuchungen über die praktische Verwendbarkeit einer Formolvakzine gegen das seuchenartige Verwerfen der Rinder. [**Results of the Use of a Formol-Vaccine against Bovine Brucellosis**].—*Z. InfektKr. Haustiere*. 52. 816-827. 8 tables.

I. A general paper dealing with the conventional measures.

II. The results of the vaccination of cattle against brucella infection by both living and dead vaccines are discussed mainly as a résumé of the literature. The conclusion drawn is that there is, at the moment, no satisfactory vaccine.

III. The results obtained by the use of the vaccine previously described by D. [see above] are given. A total of 28,000 cattle, sheep and goats were vaccinated, and it is stated that after vaccination the number of abortions and cases of sterility were markedly reduced. It was found that one injection conferred immunity and that this could be given without danger during gestation. No case of human infection could be traced to the use of the vaccine.

IV. K. gives the following details of his vaccine:—a mixture of ten strains of *Br.a* is grown in liquid media for 2-4 weeks; 0.2% formalin is then added and the flasks are reincubated for 24 hours. After sterility tests the vaccine is issued, the dose being 10 c.c. followed in four weeks by 20 c.c. and 12 weeks later by a further 20 c.c. After the third injection the blood titre reaches 1:100 and then falls steadily till it becomes negative at the 12th week.

In the vast majority of cases no ill effects followed the injections, but occasionally the milk yield was affected or slight fever was observed. Double doses could be used where a fresh and virulent outbreak was encountered. In 1,688 cattle in herds newly infected with *Br.a*. and in which there was a loss of 19.8% of calves, this loss was reduced to 0.9% after vaccination. In herds in which the infection was of long standing, containing 762 animals, a 15.9% calf loss was reduced to 0.6%.—P. S. WATTS.

IZAR, G., & FAMULARI, S. (1936). Differenziazione dei tipi nel gruppo brucella mediante cultura su terreni addizionati di acido lattico. [**Differentiation of Brucella by Lactic Acid Media**].—*Rif. med.* 52. 1015-1016. 1 table. [Also appeared in *Klin. Wschr.* 15. 1560-1561]. [Abst. from abst. in *Boll. Sez. ital. Soc. int. Microbiol.* 8. 209-210.]

The authors state that types of brucella can be differentiated by cultivation on media containing lactic acid in proportions of 10%, 1.25% and 0.625% respectively. *Br. suis* develops in the presence of all three concentrations, *Br. abortus bovis* does not develop in any, and the human strain only develops in the presence of 1.25% and 0.625% of lactic acid. The authors used only three human, four bovine and two porcine strains in their experiments.

POPOV, I. (1937). Epidemiologičeskoe obsledovanie na brucellez podopytnogo ovčevodčeskogo khozjaistva ekspedicii. [**An Epidemiological Study of Brucellosis in Man on the Expedition's Sheep-Farm**].—*Brucellosis in Sheep*. pp. 435-448. 10 tables. Moscow: Viem Publ. Dept. [See also *V. B.* 9. 78].

Serological and allergic tests showed that 19.5% (128 out of 681 men and women tested) of the total personnel on the Experimental Sheep Farm of the Expedition were infected with brucellosis. The highest incidence of the disease occurred among the veterinary personnel (77.7%), the shepherds (52.8%), and the animal attendants (50%), demonstrating the high professional risk of direct contact with infected stocks. The fact that the allergic tests were somewhat more sensitive than the agglutination test in the diagnosis of brucellosis in man was adduced.

O'CALLAGHAN, W. P. (1937). **Undulant Fever in Ireland.**—*Irish. J. med. Sci.* July. pp. 285-302. 4 figs. [Numerous refs.] [Copied verbatim from *Bull. Hyg., Lond.* 12. 881. Signed A. JOE].

In the Irish Free State the first case of undulant fever was described in 1930. Since then 21 cases have been reported from the author's laboratory, including 9 in 1936. The latter number is the highest in any one year and is ascribed to more frequent reference to laboratory methods in the elucidation of obscure febrile conditions. Three of the cases were confirmed by blood culture and all showed *Brucella* agglutinins at levels ranging from 1-250 to 1-10,000, the majority being above 1-1,000. It is stated that 20 cases have been described in Northern Ireland between 1932 and 1936, and it is probable that another 20 or 30 cases are known in the experience of other laboratories. The clinical details of cases are similar to the form of the disease seen in Britain, the Continent, and the U.S.A. Of the author's 21 cases, 18 were males aged between 25-50, and 7 occurred among land or cattle workers. Among some thousands of Wassermann sera tested, *Brucella* agglutinins have been found in measurable amounts in 20 per cent., thus suggesting past or present experience of the infection.

EHRISMANN, O. (1937). Ueber anaerobes Bakterienwachstum in synthetischen Nährlösungen. [**Anaerobic Bacterial Growth in Synthetic Culture Media**].—*Zlb. Bakt. I. (Orig.)* 140. 273-280. 1 fig. [Numerous refs.]

E. developed work on *Corynebacterium diphtheriae* to include the growth of this organism on synthetic media under anaerobic conditions. He then elaborated the media to support the growth of the strict anaerobes *Clostridium tetani*, *Cl. welchii*, *Cl. botulinum*, *Cl. chauvoei*, *Cl. septicum*, and *Cl. putrificum*, and found that these could be cultivated if many amino-acids were combined and ascorbic acid added. His final medium was:—NaCl, 2 g.;  $\text{KH}_2\text{PO}_4$ , 1.7 g.;  $\text{Na}_2\text{HPO}_4$ , 0.7 g.;  $\text{MgCl}_2$ , 0.2 g.;  $\text{CaCl}_2$ , 0.2 g.;  $\text{NH}_4\text{Cl}$ , 3 g.;  $\text{Na}_2\text{S}$ , 0.5 g.; glucose, 5 g.; sodium asparaginate, 5 g.; sodium glutamate, 5 g.; arginine carbonate, 0.1 g.; cystin, 0.02 g.; histidine, 0.05 g.; leucine, 0.12 g.; tryptophane, 0.02 g.; tyrosine, 0.04 g.; valine, 0.15 g.; ascorbic acid, 1.0 g., and distilled water, 1,000 g.: the pH was 7.6 (adjusted with NaOH).—P. S. WATTS.

OZZANO, T., & RE, C. (1937). L'influenza della onde corte hertziane sui germi patogeni. [**Influence of Short Waves on Pathogenic Bacteria**].—*G. Batt. Immun.* 18. 535-547. [Numerous refs.] [English, French and German summaries].

No significant changes were observed in the growth and other properties of cultures of pathogenic bacteria, including *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella paratyphi* A, either after a single irradiation for 30 minutes with radio short waves (7.86 m. and 4.80 m.) or after repeated 30-minute irradiations at intervals of 1-5 hours. The effects of the treatment varied from stimulation to depression, but were always compensated by the recuperative powers of the organisms. It is believed that the effects noted were solely due to the temperature factor.

MACKINNON, J. E. (1936). Epizootia de tñia en caballos y contaminación del hombre. [**Ringworm in Horses and its Transmission to Man**].—*Arch. urug. Med.* 8. 498-502. [6 refs.]

M. reports cases of ringworm in five horses and the transmission of infection to a man. Microscopic examination revealed the presence of an endo-ectothrix megaspore organism which was cultivated on Sabouraud's gelatin medium

with 8% pure bee honey and on Sabouraud's gelatin with 4% Chanut's crude maltose, at a temperature of 30°C. The cultures were downy in appearance, at first white and then cinnamon coloured. On the tenth day they were typical of *Trichophyton equinum*.

The groom who had charge of one of the animals had a lesion on his forearm which had responded to treatment with local applications of iodine. F. was unable to make a microscopic examination, but the diagnosis of the doctor in charge had led to the examination of the horses.

A description of the various agents of ringworm, especially in horses, is given. It has been stated that ringworm in man in Brazil is nearly always due to infection from animals and not from human beings.

SHAHAN, M. S. (1937). **A Dermatomycosis of Guinea-Pigs.**—*Arch. Derm., Chicago*. 36. 335-341. 4 figs.

S. investigated small cutaneous lesions, occurring chiefly on the head and face, in a stock of breeding g. pigs. The affected areas were scaly, depilated and faintly reddened, but there appeared to be no pruritus; recovery was spontaneous. No mites were revealed by microscopic examination.

Cultures from lesions yielded felt-like colonies of a fungus, at first (microscopically) resembling *Microsporon felineum*, but later tentatively identified as *Achorion gypseum* Bodin.

Most in-contact g. pigs became affected, but none in neighbouring cages; the condition was easily reproduced in other g. pigs and also in rabbits, rats, mice, cats and a dog, by rubbing lesion material on to the skin.

BLUMENTHAL, F. L., & SNOW, J. S. (1936). **A Rapid Cultural Method for the Diagnosis of Tinea Infections.**—*J. Amer. med. Ass.* 107. 1867-1869. 4 figs., 1 table. [6 refs.]

Direct microscopic examination of 48 cases of ringworm revealed filaments in 38%; cultures on Sabouraud agar gave positive results in 64% of the same cases, while hanging drop cultures from hairs or scales gave 72% of positive results within less than two days.

## DISEASES CAUSED BY PROTOZOAN PARASITES

PASINATI, P. (1937). Un interessante caso di miosite interstiziale fibrosa con sarcosporidi in una bovina. [**Sarcosporidial Interstitial Myositis in a Bovine**].—*Clin. vet., Milano*. 60. 97-99. 4 figs. on 2 plates.

The muscles of a cow were found to have been invaded by large growths of interstitial connective tissue with partial hyaline degeneration of the muscle fibres; numerous areas of inflammation were found, with sarcosporidia in different stages of development.—HANS GRAF (ZÜRICH).

BONNIN, F. (1937). La résistance des protozoaires et des protozooses aux médicaments. [**The Resistance of Protozoa and Protozoan Diseases to Drugs**].—*Festschrift Bernhard Nocht, 1937*. pp. 49-52. Hamburg: Friederichsen, de Gruyter & Co. [In French].

Abnormal resistance of protozoa to drugs may be due either to an inherent quality of the strain, to the acquisition of resistance during treatment, or to the interference by the host system with the action of the drug. It is pointed out that ineffective treatment of syphilis may create drug-resistant strains of the spiro-

chaete in the same way that drug-resistant strains of trypanosomes are produced. It is suggested that this danger may be largely avoided by the use of the maximum tolerated dose of the drug, or by the use of two drugs which supplement each other's action when given at the same time.—U. F. RICHARDSON.

SCHWETZ, J. (1938). Quelques réflexions et suggestions pour une future classification des trypanosomes pathogènes de l'Afrique centrale. [**Some Reflections and Suggestions for the Classification of Pathogenic Trypanosomes of Central Africa**].—*Ann. Parasit. hum. comp.* 16. 265-272. [10 refs.]

In discussing the classification of African trypanosomes, S. suggests that it is unreasonable to deny specific identity to *Tryp. dimorphon*, a long slender organism, and to *Tryp. montgomeryi*, a broad type, which differs morphologically from *Tryp. congolense* in length and breadth, whilst accepting *Tryp. simiae* which, according to the description of BRUCE, only differs from *Tryp. congolense* in being slightly larger.

He points out that, with the recognition of the fact that a free flagellum may occur in the pig trypanosome belonging to the *Tryp. congolense* group, this group can no longer be described as monomorphic in that respect.

He divides the trypanosomes into three groups distinguished by the position of the blepharoplast:—1. *Tryp. congolense* group, characterized by the lateral position of the blepharoplast, with the species *Tryp. congolense*, *Tryp. dimorphon*, *Tryp. montgomeryi*, and *Tryp. suis* [*Tryp. simiae*]. 2. *Tryp. vivax* group, characterized by the terminal or sub-terminal position of the blepharoplast, and including the species *Tryp. vivax*, a large form with sub-terminal blepharoplast, *Tryp. cazalboui*, a smaller form with terminal blepharoplast, and *Tryp. uniforme*, a still smaller form. He suggests that *Tryp. caprae* may be a synonym of *Tryp. cazalboui*. 3. *Tryp. brucei* group, in which the blepharoplast may be terminal or lateral, and including the species *Tryp. brucei*, *Tryp. pecaui*, *Tryp. gambiense* and *Tryp. rhodesiense*.

[Although on general grounds this classification has much to recommend it, yet the position of the blepharoplast varies from individual to individual and with the stage of maturity. It is not such a definite characteristic as the presence or absence of a free flagellum, which can only lead to error in the case of *Tryp. simiae*, an atypical member of the *Tryp. congolense* group].—U. F. RICHARDSON.

REICHENOW, E. (1937). Die bisherigen Erfahrungen mit der Dauerzüchtung afrikanischer pathogener Trypanosomen. [**Experiences in the Longevity of Cultures of African Pathogenic Trypanosomes**].—*Festschrift Bernhard Nocht, 1937*. pp. 487-496. [5 refs.] Hamburg: Freiderichsen, de Gruyter & Co. [In German].

The records of the cultivation of *Tryp. gambiense*, *Tryp. brucei* and *Tryp. congolense* in citrated human or ape blood to which Ringer solution is added, are briefly given. *Tryp. gambiense* has been cultivated through 48 generations, and *Tryp. congolense* to 86 generations. The cause of failure of sub-culture is discussed, and it is pointed out that some human blood has an inhibitory action, whilst in other cases too low an incubator temperature was responsible for death. The best growth appears to occur at between 25° and 26°C.

R. points out, however, that trypanosomes in culture are similar to the developmental stages of the organisms in the intestine of *Glossina*. Culture is difficult in old strains of *Tryp. gambiense*, and sub-cultures often fail, and it is suggested that this phenomenon is related to the loss of transmissibility by tsetse fly which also occurs in old laboratory strains. In the case of *Tryp. congolense*, it was found

possible to obtain cultures of all strains, but in first cultures multiplication only occurred in a small proportion of the tubes. R. was unable to produce infection of vertebrates with organisms from culture, but BRUTSAERT and HENRARD [*V. B.* 8. 568.] claim to have infected two goats by the inoculation with cultures of *Tryp. congolense*. R. suggests that accidental infection may have occurred, and points out that metacyclic trypanosomes do not appear in cultures. It has also proved impossible to cultivate *Tryp. vivax*, and it is suggested that this is because this species only develops in the proboscis of the fly, and that intestinal development does not occur. Experience has also confirmed that cultures do not succeed in the case of *Tryp. equinum* and *Tryp. equiperdum*, which have no development cycle in a vector host. Attempts to use cultured organisms for immunization have given negative results.—U. F. RICHARDSON.

ZEISS, H. (1937). Die Bekämpfung der Kameltrypanosomiasis in Russland. [*Control of Camel Trypanosomiasis in Russia*].—*Festschrift Bernhard Nocht, 1937*. pp. 674-682. 5 figs. on 1 plate. [Numerous refs.] Hamburg: Friederichsen, de Gruyter & Co. [In German].

Z., who worked on the problem of camel trypanosomiasis in Russia for nine years, is of the opinion that the trypanosome concerned is very similar to, and probably identical with, *Tryp. evansi*. He was unable to detect any species of animal, except the camel, which might act as a reservoir host. Although other authors had reported that horses might carry the infection, he was unable to confirm this in his area—the Volga and Urals. He considers that transmission is through the agency of biting flies (*Tabanus*, *Chrysops* and *Haematopota*). He considers that the disease can be controlled by the treatment of affected camels, and obtained good results with naganol used intravenously in doses of 4-10 g., and on a small scale with naganol combined with antimosan or stibosan. He was unable to confirm that tryparsamide was of value in treatment.—U. F. RICHARDSON.

GRANOUILLET, F., & DO-VAN-VIEN. (1938). Observations sur le surra naturel des bovo-bubalins, du chien et du cheval en Cochinchine. [*Natural Surra in Cattle, Buffaloes, Dogs and Horses in Cochin-China*].—*Rev. Méd. vét., Toulouse*. 90. 402-411. [12 refs.]

This article records serious disease in cattle and buffaloes affected with surra, associated with fluke infestation. It is suggested that the fluke infestation of the liver prevents the attainment of the leucocytic equilibrium required to combat the trypanosome infection. Other diseases such as rinderpest or haemorrhagic septicaemia may also break down the resistance of the animal to a trypanosome infection which had previously been controlled.

In one area, naganol treatment of infected horses and dogs was not successful, and it is suggested that the passage of the trypanosome through horses may enhance its virulence for dogs, cattle and buffaloes, and also reduce its susceptibility to treatment with naganol.

Disease in horses is recorded in which no trypanosomes could be detected till just before death, which occurred suddenly with an extraordinary rapid destruction of red blood corpuscles. It is suggested that the animals had been infected for four months previous to the detection of trypanosomes. [No description is given of the trypanosome concerned, and possibly an organism other than *Tryp. evansi* was involved].—U. F. RICHARDSON.

CARDONA, L. (1937). Sulla refrattarietà verso il *Trypanosoma evansi* di alcuni uccelli domestici ad alimentazione normale e a regime avitaminico. [*Resist-*

ance to *Tryp. evansi* of Fowls on Good or Avitaminotic Diets].—*Nuova Vet.* 15. 103-106.

The object of these experiments was first, to test the alleged immunity of birds to *Tryp. evansi*, and secondly to find whether this immunity was affected by keeping the birds on an avitaminotic diet. C. used two hens, two pigeons, and two turtle-doves, inoculating them with blood taken from an infected g. pig. The birds remained in good health, and repeated tests failed to detect a single trypanosome in the blood stream. An attempt to infect healthy g. pigs from the blood of the experimental birds also failed. He then put all the birds on an avitaminotic diet, but even when the birds sickened from the diet he was unable to infect them with trypanosomes, and found no trace of the parasites in any of the birds on P.M. examination.—S. F. J. HODGMAN.

LAUNOY, L. (1938). Distinction entre la chimio-résistance naturelle présentée par *Trypanosoma congolense* et la chimio-résistance acquise par *Trypanosoma annamense*. [Distinction between the Natural Drug-Resistance of *Tryp. congolense* and the Acquired Drug-Resistance of *Tryp. annamense*].—*Bull. Soc. Path. exot.* 31. 618-621. 1 table. [1 ref.]

Whilst drug-resistant strains of *Tryp. evansi* and strains of *Tryp. congolense* were found equally resistant to antimony in the form of aminophenylstibinate of methylglucamine, a naturally resistant *Tryp. congolense* was found to be much less susceptible to acriflavine, germanin and tryparsamide than the drug-resistant strain of *Tryp. evansi*, which had been rendered drug-resistant artificially.—U. F. R.

MARTIGNOLLES. (1938). Notes sur les trypanosomiasis animales dans la région de Ouagadougou. (Relations avec la trypanosomiasis humaine). [Animal Trypanosomiasis in the Ouagadougou District].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 8. 10-12.

A survey of bovine trypanosomiasis in Ouagadougou, French West Africa, revealed an approximate correlation with human infection. It is stated that the disease in cattle has spread to the north, and that certain areas have been rendered uninhabitable for cattle of the zebu type or for horses. The species of trypanosome encountered in cattle is *Tryp. vivax*, and infection can be cured by intramuscular injection of tartar emetic in oil, or by tryparsamide. The only tsetse present in the area are *Glossina tachinoides* and *G. palpalis*, and the Harris trap is recommended as a method of destruction.—U. F. RICHARDSON.

BROWN, H. C., & BROOM, J. C. (1938). Studies in Trypanosomiasis. II. Observations on the Red Cell Adhesion Test.—*Trans. R. Soc. trop. Med. Hyg.* 32. 209-222. 2 figs., 8 tables. [16 refs.] [See also *V. B.* 8. 212].

As irregular results were obtained with the red cell adhesion test in the study of the serology of *Tryp. brucei* strains in rats, an investigation was undertaken regarding the influence of varying concentrations of trypanosomes and red corpuscles on adhesion. The extent of adhesion was found to depend largely on the concentration of red cells, and to some extent on the concentration of trypanosomes; the greater the concentration of red corpuscles, the greater was the degree of adhesion. It was also found that the degree of adhesion varied with the time of inoculation, and a standard was adopted of incubating for five minutes at 37°C. equal volumes of immune serum, a 1:5 dilution of fresh g. pig serum, and washed suspensions of human red cells and trypanosomes standardized to 500,000 per c.mm. and 5,000 per c.mm. respectively.

It was confirmed that the red corpuscles of laboratory animals will not adhere to the sensitized trypanosomes, and that the red blood corpuscles of certain human

beings may have little or no adhesive properties. It was also found that, whilst some bacteria exhibited adhesion, other strains of the same species did not. Experiments failed to explain this variation in corpuscles or in bacteria.

It was found that homologous serum caused the agglomeration and lysis of the trypanosomes in the absence of suitable adhesive particles.—U. F. RICHARDSON.

KUJUMGIEFF, I. (1937). Sul comportamento sperimentale dei volatili verso il *Trypanosoma equiperdum*. [**Experimental Tryp. equiperdum Infection in Fowls and Pigeons**].—*G. Batt. Immun.* 19. 388-386. [5 refs.] [English, French, and German summaries].

Attempts to infect fowls and pigeons by subcutaneous or intravenous injections of *Tryp. equiperdum* gave negative results.

WAGNER, O., & HEES, E. (1937). 156 positive *Trichomonas*blutbefunde bei Mensch und Tier. [**Trichomonas Blood Tests in Man and Animals**].—*Zlb. Bakt. I. (Orig.)*. 133. 278-290. 7 figs., 4 tables. [11 refs.]

The observations were mostly on the parasites of human beings. Little is said concerning the species that occur in animals. It is recorded that trichomonads were also observed in the blood of 25 bulls, 56 cows, 11 mares, one pig, one dog and three cats. The organism was also isolated from the genital tract of some of the bovines and from the intestine of the total of ten cats examined. The parasitic nature of trichomonads is discussed.—J. E.

OEHLKERS, H. (1937). Ueber den gelben Knopf und die sonstigen Trichomonadenerkrankungen der Tauben. [**"Yellow Button" and Trichomoniasis in Pigeons**].—*Inaug. Diss., Hanover*. pp. 55. 1 table. [13 refs.]

O. gives a detailed account of his studies on the occurrence, symptoms, aetiology, and control of *Trichomonas columbae* infection in pigeons in Germany. Of 828 adult pigeons, 56.6% carried the organism in their oesophageal mucosa; from this situation it can be transmitted to the young in feeding. The most dangerous and common form of the disease, the "yellow button" lesion [*V. B.* 8. 697.], only attacks young birds (10- to 25-day-old), and is frequently confined to the progeny of given parents. In such cases the progeny of valuable, infected parents, may be saved by hatching their eggs under a healthy pair.

SIMITCH, T. (1938). Sur une amibe buccale du chien *Entamoeba canibuccalis* n. sp. [**A New Amoeba in the Mouth of Dogs E.c. n. sp.**].—*Ann. Parasit. hum. comp.* 16. 251-253. 1 fig. [1 ref.]

S. found that three out of 165 dogs examined at Skopje carried an amoeba in their saliva which was differentiated from *E. gingivalis* in man. In one dog the organism was alone, in another it was associated with *Trichomonas canistomae*. A description is given of its morphology and cultural characteristics. Experiments showed that it could not infect man, whilst *E.g.* could not infect dogs under normal conditions. Inoculation into the intestine of young dogs gave negative results.

BRUMPT, E. (1938). Le *Plasmodium bubalis* Sheather 1919, du buffle domestique d'Asie, peut-il évoluer chez les anophèles? [**The Possible Development of *Pl.b.* of the Buffalo in *Anopheles***].—*Ann. Parasit. hum. comp.* 16. 369-373. 1 fig. [13 refs.] [See also *V. B.* 9. 155].

B. again draws attention to the importance of ascertaining the prevalence of *Pl.b.* infection in view of the possibility that the oocyst forms in *Anopheles* may be mistaken for those of human plasmodia.—U. F. RICHARDSON.

HEGNER, R., & ESKRIDGE, Lydia. (1938). **Susceptibility of Young Red Cells to the Merozoites of Avian Plasmodia.**—*Amer. J. Hyg.* 27. 471-492. 1 plate, 3 tables. [Numerous refs.]

The literature is reviewed and the differences between young and old R.B.C. are described in detail. It was found that in hen canaries artificially infected with *Pl. cathemerium*, although the peripheral blood only contained 1.6% of young R.B.C., trophozoites were present in 88.5% of them compared with 16.5% in old cells. Many of the young cells contained several merozoites.

By injecting phenylhydrazine hydrochloride the percentage of young R.B.C. could be raised to over 90, and heavier infections were found in these birds. It is suggested that as the disease progresses the young R.B.C. are rendered more resistant to infection.—J. E. WILSON.

NEITZ, W. O. (1937). **Eperythrozoonosis in Sheep.**—*Onderstepoort J. vet. Sci.* 9. 9-30. 5 tables. [18 refs.]

Eperythrozoonosis of sheep is an infectious disease caused by *Eperythrozoon ovis*, a small supra- and intercellular blood parasite having a ring, rod, irregular or oval shape, and belonging to the family Anaplasmatidae. The disease is characterized by an irregular pyrexia, a variable degree of icterus, and anaemia. Relapses may occur at varying intervals after recovery. The mode of transmission is unknown, but it would appear that the vector is a blood-sucking insect. The disease has been found in merino and Black Head Persian sheep, and is probably wide-spread in South Africa. When stained by Giemsa's method the parasites are pale mauve to pinkish mauve, and resemble delicate rings, about 0.5-1 $\mu$  in diameter. In addition to rings are found triangles with rounded angles, ovoid, comma, rod, dumbbell and tennis racket forms. The parasites usually appear 5-7 days after infection, and are present in their greatest numbers 5-10 days after their first appearance. They are seen in the blood for about 14 days on the average, but may be present for as long as 42 days. The course of the disease does not differ in splenectomized sheep. Only one death has been recorded.

The immunity in this disease is a premunition. The arsenostibio preparation Std 886 B was found to be a specific for treatment, the effective dose being 5 mg. per kg. body weight.—E. M. ROBINSON.

ALLEN, Ena A. (1937). ***Tyzzeria perniciosa* gen. et sp. nov., a Coccidium from the Small Intestine of the Pekin Duck, *Anas domesticus* L.**—*Arch. Protistenk.* 87. 262-267. 12 figs. on 2 plates. [6 refs.] [In English].

A. describes the life-cycle and pathogenicity of a new coccidium of the duck, which has been named *Tyzzeria perniciosa*. A key to the genera of the sub-family Cryptosporidiinae is given; the sporulated oocyst of *T.p.* (measuring 9-10 $\mu$  by 10-13 $\mu$ ) resembles those of *Pfeifferinella* and *Schellakia*, having eight sporozoites (measuring 10 $\mu$  by 8.5 $\mu$ ) lying directly within the oocyst wall. Complete oocysts were observed in the faeces on the sixth day after infection of experimental ducks. Young ducks died within a few days of the appearance of symptoms, and autopsy revealed severe intestinal inflammation and haemorrhage, and white spots on the exterior of the intestinal wall, which was thickened; the lumen was sometimes filled with a cheesy exudate, which was not in the form of a core as in *Eimeria tenella* infections. A. stresses the depth to which the parasites had penetrated, microscopic examination revealing them even in the muscle layers.

The genera *Pfeifferinella* and *Tyzzeria* are compared, *Tyzzeria* differing from the former in that it has three types of schizont in the life-cycle.

PIGOURY, L. (1937). Piroplasmes et piroplasmoses en Syrie et au Liban. [**Piroplasmosis and Piroplasms in Syria and Lebanon**].—*Bull. Soc. Path. exot.* 30. 767-772.

An account of animal piroplasms observed up to the present time in the Levant. P. believes that indigenous animals acquire natural infection and immunity early in life: therefore the appearance of acute piroplasmosis is not common.

He has only found *Babesia caballi* in horses (and once in an ass), but *B. equi* is also believed to occur. Equines are liable to pass through attacks of fever in the spring, but they recover spontaneously. The tick vector is believed to be *Hyalomma savignyi*.

Only one piroplasm has been seen in cattle, and it is similar to *Babesiella berbera* of North Africa. The disease due to this organism occurs here and there throughout the year, and is manifested by fever, jaundice, anaemia and haemoglobinuria. The vector seems to be one or other species of *Hyalomma* (*H. savignyi*, *H. dromedarii*, *H. mauritanicum* or *H. aegyptium*). *Boophilus annulatus calcaratus* was found once on an affected bovine.

In 1937, piroplasmosis was diagnosed in sheep and goats in these regions for the first time, being similar as to causation and symptoms to the disease in cattle. *Anaplasma marginale*, *Theileria recondita* and *Erythrocytozoon ovis* have also been found in affected sheep; only lambs and kids are affected. The tick vectors are *Rhipicephalus sanguineus* and *Rh. bursa*.

Canine piroplasmosis [*B. canis* evidently meant] has often been observed, and *Rh.s.* is presumably the vector.—J. E.

CURASSON, G. (1938). Notes sur la piroplasmose aviaire en A.O.F. [**Avian Piroplasmosis in French West Africa**].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 2. 88-85.

C. notes the frequency of the occurrence of avian piroplasmosis in French West Africa. He discusses the pathogenicity of *Aegyptianella pullorum* for various domestic and wild birds, giving a brief historical review of the work done on the nature of the parasite. The curative value of several drugs is compared. Two intramuscular injections of gonacrine gave the best results.—F. H. MANLEY.

## DISEASES CAUSED BY VIRUSES

CRAWFORD, M. (1938). Immunity Following a Natural Attack of Foot-and-Mouth Disease.—*Vet. Rec.* 50. 801-802.

Experience with F. & M. disease at the Government Dairy, Colombo, Ceylon, showed that naturally induced immunity in cattle lasts for at least two years. The records of the dairy show that in every outbreak of F. & M. disease a large proportion of the herd escape infection due to previously acquired immunity, and that in nearly every instance the animals which become infected are among those introduced since the previous outbreak.—D. D. OGILVIE.

FRENKEL, H. S., & VAN WAVEREN, G. M. (1938). Immunisatieproeven verricht met gekweekt mond- en klauwzeer virus. [**Immunization Trials with Cultivated Foot and Mouth Disease Virus**].—*Tijdschr. Diergeneesk.* 65. 264-281. [English, French and German summaries].

Virus from a field case of F. & M. disease was found to be type O (Vallée), and was pathogenic for g. pigs. It was grown in cattle embryo tissue cultures, and a tissue culture diluted 1:10,000 was pathogenic for g. pigs, causing generalization 48 hours after injection into the tongue.

In experiments on cattle with simultaneous injection of culture virus and serum, no difference was noticed in the effect when the serum was injected 18 hours before the tissue culture, or at the same time. An attempt was made to combine serum-virus injection and treatment of the feet with disinfectants. Dressing the feet with a 10% solution of tincture of iodine and washing the teats with a 0.5% NaOH solution were said to be helpful.

The serum-virus method was uneconomical owing to the large quantity of serum required. In further experiments, therefore, virus alone was used combined with the above prophylactic disinfection measures. The technique was to clean the feet and dress them with a 10% iodine solution, and apply a culture diluted 1:5,000 to the tongue. Teat infection occurred in some of the test animals and it was ascribed to contaminated straw. This treatment produced a more severe generalization in young animals than did the simultaneous method, but the animals usually recovered without complications.—JAC. JANSEN (UTRECHT).

- I. PILOTTE. (1938). Notes au sujet du traitement de la fièvre aphteuse. [**Treatment of Foot and Mouth Disease**].—*Echo vét., Gembl.* 67. 71-76.
- II. PIEROT. (1938). Valeur prophylactique et thérapeutique du lait virulent dans la fièvre aphteuse. [**Preventive and Curative Value of Virulent Milk (Subcutaneously Injected) in F. & M. Disease**].—*Rev. Path. comp.* 38. 226-227.
- III. PIEROT. (1938). De l'influence de l'alimentation sur l'évolution de la fièvre aphteuse. [**Influence of Diet on the Course of F. & M. Disease**].—*Ibid.* 811-813.
  - I. Owing to the severity of the wide-spread outbreak of F. & M. disease in Belgium, the current methods of controlling the disease have been ineffectual. The injection of in-contact susceptible cattle with immune serum from recovered animals has proved reasonably effective, however, since 10% were completely protected, while in the remaining 90% the disease occurred in a very mild form.
  - II. Milk obtained from cattle at the height of an attack of F. & M. disease and injected into susceptible cattle induced a benign attack of the disease followed by immunity.
  - III. In recent outbreaks the most severe cases of F. & M. disease occurred in fat cattle, especially those which were receiving a supplement of cake in their diet.—R. E. GLOVER.

RUBINO, M. C. (1936). Le fiebre aftosa. Medios para combatirla de que se dispone actualmente. [**Foot and Mouth Disease Control**].—*Bol. mens. Direcc. Ganad., Montevideo.* 20. 161-174.

A speech to a lay audience. The methods of control followed in different countries are discussed and also those which can be used in Uruguay; eradication was not advocated.

HOLZ, K. (1938). Beiträge zur sogenannten Bornaschen Krankheit (Kopfkrankheit) und der ansteckenden Blutarmut des Pferdes. [**Borna Disease and Equine Infectious Anaemia**].—*Z. InfektKr. Haustiere.* 53. 161-174.

The symptomatology of Borna disease and that of E.I.A. are very similar, and differential diagnosis may be difficult. Encephalitis may occur in the course of E.I.A. and is probably related to the presence of a granular ependymitis. A peculiar haemorrhagic form of Borna disease occurs in Württemberg in addition

to the classic form. Granular ependymitis is primarily a productive inflammatory process in which there occurs a periarteritis with marked fibroblast proliferation. Borna disease is characterized by acute inflammatory lesions with perivascular infiltration of lymphoid cells, mainly around small veins.—E. G. WHITE.

- I. SABIN, A. B., & OLITSKY, P. K. (1938). **Variations in Pathways by which Equine Encephalomyelitic Viruses Invade the CNS of Mice and Guinea-Pigs.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 595-597. [5 refs.]
- II. SABIN, A. B., & OLITSKY, P. K. (1938). **Age of Host and Capacity of Equine Encephalomyelitic Viruses to Invade the CNS.**—*Ibid.* 597-599. [5 refs.]
- III. JABOTINSKI, J. (1938). Les altérations histopathologiques du système nerveux des lapins dans l'infection expérimentale avec le virus de "l'encéphalo-myéélite équine." [*Histopathology of Equine Encephalomyelitis in Rabbits*].—*Ann. Inst. Pasteur.* **60**. 451-464. 7 text figs., 32 figs. on 6 plates.
  - I. Eastern equine encephalomyelitis virus, injected into the leg muscles of mice 15-21 days old, invaded the C.N.S. along the peripheral nerves in only 5% of cases, whilst in the others it reached the C.N.S. by the olfactory pathway, *i.e.*, *via* the blood and olfactory mucosa. With Western virus the path varied; among 15-day-old mice, 80-90% exhibited signs of olfactory invasion, and in 10-20% spread was by the peripheral nerves. In 21-day-old mice the position was reversed.
  - II. Natural resistance studies demonstrated that as mice and g. pigs grow older, certain changes occur in the tissues, which may then act on localized barriers to the invasion of, or passage of virus in, the C.N.S. [see also I, above].
  - III. On the basis of his studies with a neurotropic virus which is responsible for a clinical condition in France with lesions resembling Borna disease and equine encephalomyelitis in America, J. concludes that the term "encephalomyelitis" as used in connexion with this disease is a misnomer, as it is not in keeping with the symptoms or histological changes. The lesion is primarily a progressive degenerative condition of the nerve cells, the changes in the connective tissue being insignificant. The absence of any inflammatory change is one of its chief features.

A complete description is given of the various histological changes together with illustrations. The investigation was carried out with rabbits artificially infected with tissue from an infected horse.—GWILYM O. DAVIES.

RECORDS, E., & VAWTER, L. R. (1938). **Production of Antiserum for Equine Encephalomyelitis.**—*J. Bact.* **36**. 295.

Attempts at hyperimmunization even by repeated subcutaneous inoculation of equine encephalomyelitis virus often yield unsatisfactory results. The authors found that intravenous injection of a single large dose of virus gave a tenfold rise in antiviral titre within ten days. No fatalities or severe reactions were encountered. Titration of virus-neutralizing power of hyperimmune sera was tested on g. pigs and chicken embryos. The latter are considered the more dependable and economical, and the procedure is also more rapid.—J. A. GRIFFITHS.

- I. REMLINGER, P., & BAILLY, J. (1938). Non élimination du virus d'Aujeszký par la muqueuse gastro-duodénale. Caractère différentiel avec la rage. [*Differentiation of Aujeszký's Disease Virus from Rabies by Failure of the Former to Infect the Gastro-Duodenal Mucosa*].—*C. R. Soc. Biol. Paris.* **127**. 965-966.
- II. REMLINGER, P., & BAILLY, J. (1938). La glycémie et le rapport chloré érythro-plasmatique dans la maladie d'Aujeszký. [*The Chlorine and Sugar Content of the Blood in Aujeszký's Disease*].—*Ibid.* **128**. 178-180. 2 tables.

- III. GORET, P., & MARIETTE, C. (1938). Réceptivité du furet (*Putorius furo* L.) au virus de la maladie d'Aujeszky inoculé par différentes voies. [**Susceptibility of the Ferret to the Virus of Aujeszky's Disease**].—*Ibid.* 871-873.
- IV. REMLINGER, P., & BAILLY, J. (1938). Action de la bile sur le virus de la maladie d'Aujeszky. [**Effect of Bile on the Virus of Aujeszky's Disease**].—*Maroc méd.* 18. 350.

I. Rabbits, guinea pigs, dogs and cats were inoculated by different routes with the virus of Aujeszky's disease, and specimens of gastric and duodenal secretions, taken after death, were transmitted to susceptible animals. In contradistinction to the results obtained with rabies virus, these secretions were invariably non-infective.

II. A biochemical examination of blood from rabbits and dogs suffering from Aujeszky's disease showed a marked increase both in the sugar and chloride contents of the blood. The elevation in the latter was almost entirely due to an enrichment of chloride in the cellular elements.

III. Ferrets inoculated with the virus of Aujeszky's disease by the intra-ocular and intramuscular routes succumbed within four days after exhibiting well-marked pruritus. Animals inoculated intracerebrally also died within four days.

IV. Rabbit brain containing the virus of Aujeszky's disease was rapidly inactivated by ox, sheep, pig, dog or rabbit bile. The absence of virus was determined by the injection of the mixtures into the anterior chamber of the eye of experimental animals.—R. E. GLOVER.

- I. JACOTOT, H. (1937). Quelques cas remarquables de prolongation de la période d'incubation chez des cobayes inoculés de rage des rues après vaccination. [**Prolonged Incubation Period in Guinea Pigs Inoculated with Street Rabies Virus after Vaccination**].—*C. R. Soc. Biol. Paris.* 126. 849-851.
- II. JACOTOT, H., COLSON, M., & LE ROUX, G. (1938). Contribution à l'étude expérimentale de la vaccination antirabique. [**Experiments on Antirabic Vaccination**].—*Ann. Inst. Pasteur.* 61. 92-103.
- III. CRUVEILHIER, L., LEPIE, P., & VIALA, C. (1938). Pouvoir rabcide du sérum sanguin de lapins vaccinés contre la rage comparativement par la méthode des moelles desséchées et au moyen du vaccin phéniqué. [**Comparison of the Rabcidal Power of the Blood Serum of Rabbits Vaccinated against Rabies by Dried and Phenolized Virus Respectively**].—*Ibid.* 187-192. 1 table. [2 refs.]
- IV. DODERO, J. (1938). Taux de souillure des moelles et des cerveaux rabiques. [**Extent of Bacterial Contamination of the Brain and Spinal Cord in Rabies**].—*Bull. Soc. Path. exot.* 31. 562-564. 2 tables. [1 ref.]

I. Four g. pigs vaccinated against rabies and then tested with a street virus, succumbed after long periods (16-30 weeks). In each instance rabies virus was recovered from the brain.

II. G. pigs vaccinated with rabies virus inactivated with (a) ether plus phenol, (b) phenol, and (c) formalin respectively, showed some resistance to an intramuscular injection of street virus. The most satisfactory results were obtained with formalized virus, especially when two doses were given with an interval of three weeks; moreover, formalized virus conserved its antigenic value for much longer periods than the other vaccines.

It is pointed out that, as far as dogs are concerned, it is not always practicable to give two injections of vaccine, but the experiments suggest that a single injection of a double dose of vaccine would probably provide adequate protection.

III. Rabbits were inoculated with multiple doses of cerebral tissue containing rabies virus inactivated by (a) desiccation, and (b) 1% formal for 24 hours at 20°-22°C. Graded amounts of their sera were added to fixed doses of the virus and the mixtures inoculated intracerebrally into g. pigs. In almost every case neutralizing antibodies were detectable, the amounts of serum required to neutralize an equal amount of a 1 : 100 dilution of virus (titre not given) varying from 0.25 c.c. up to 2 c.c. The conclusion was reached that the phenolized suspension was as active as dried brain in stimulating antibody formation.

IV. Bacterial contaminations varying from 11% to 18% were found in the spinal cords of rabbits inoculated with rabies virus and killed in the last stages of the disease. Less than 4% of the brains from the same animals were infected. The majority of the organisms isolated were inhabitants of the normal rabbit intestine.

—R. E. GLOVER.

LEACH, C. N. (1988). **Comparative Methods of Diagnosis of Rabies in Animals.**—*Amer. J. publ. Hlth.* 28. 162-166.

The results of intracerebral inoculation of mice for the diagnosis of rabies are described.

A small portion of Ammon's horn is ground up with nine parts of hormone broth and centrifuged; 0.03 c.c. of the supernatant fluid is then injected into the brain of a mouse 4-6 weeks old. Of 1,082 specimens diagnosed by microscopic examination, 690 brains were reported negative for Negri bodies, but on mouse inoculation 88 of these (12%) were positive.

The use of the mouse inoculation test shortens the time required for biological diagnosis and is inexpensive. Reactions are very consistent, and the method is claimed to be a reliable means of verifying microscopic diagnosis: it is also cheaper and more rapid than the biological test in rabbits.—D. D. OGILVIE.

PAWAN, J. L. (1988). **An Unusual Strain of Rabies Virus in a Vampire Bat.**—*Ann. trop. Med. Parasit.* 32. 85-88. [7 refs.]

A bat (*Desmodus*) caught in Trinidad was allowed to bite a rabbit, which died, after showing paralytic symptoms, within four days. Subsequently, the strain invariably killed rabbits after intracerebral and subcutaneous inoculations within 48 hours, without the presence of Negri bodies. After intrasciatic injection, however, the period of incubation was 18-20 days, and numerous Negri bodies were found in the cerebral tissues. The significance of exalted virulence in rabies virus is discussed.—R. E. GLOVER.

ISHII, S., WATANABE, S., & OZAKI, M. (1986). **Haemacytological Changes in Hog Cholera. II. Observations on White Cells and Blood-Platelets.**—*J. Jap. Soc. vet. Sci.* 15. 1-8 of pt. 2. 14 tables. [6 refs.] [In English: Japanese summary pp. 1-3 of pt. 1]. [See also *V. B.* 6. 417].

The authors first of all obtained normal values for total leucocyte counts, differential leucocyte counts, and blood platelets in eight healthy pigs aged 8-10 months. The following results were obtained:—in total leucocyte counts, the average was 16,400 per c.mm., with ranges from 10,400 to 22,500 per c.mm., and the average number of blood platelets was 29,400 per c.mm. [The range of platelet values is not given].

The same swine as had been used for the determination of normal values were then inoculated with swine fever virus. A leucopenia resulted which became worse until the period of crisis. This leucopenia was mainly due to a diminution of neutrophile leucocytes. The blood platelets also showed a similar fall.

The inoculation of an attenuated virus caused a slight leucocytosis and a slight increase in platelets. On the other hand, a weakly attenuated virus caused a picture similar to that of the natural virus.

The authors consider that the leucopenia, thrombocytopenia and relative lymphocytosis may be considered of diagnostic value in early cases of the disease.

—D. L. HUGHES.

DE KOCK, G., DU TOIT, R., & NEITZ, W. O. **Observations on Blue-Tongue in Cattle and Sheep.** - *Onderstepoort J. vet. Sci.* 8. 129-180. 1 table, 3 appendixes. [5 refs.]

Experiments are described in which it was possible to recover bluetongue virus from cattle exposed on the veld at Tzaneen in the Northern Transvaal during the months of February and March in 1934 and 1935. Artificially infected cattle showed no reactions, but could remain carriers for a period of 22 days. In fully susceptible sheep severe reactions and mortality resulted, whereas sheep immune to the Onderstepoort vaccine strain showed febrile reactions only. Sheep remained carriers of the virus up to 60 days after injection. The most important lesions in sheep as well as their pathogenesis are discussed. The virus preserved in an aqueous solution of glycerin, carbolic acid and potassium oxalate was still virulent after a period of 8½ months. A passage of 15 generations through bluetongue-vaccinated sheep and nine generations through bluetongue-susceptible sheep failed to attenuate the virus.

RUBINO, M. C., & ESPANTOSO, M. (1938). El ectima contagioso de los ovinos. [**Contagious Ecthyma of Sheep**].—*Bol. mens. Direcc. Ganad. Montevideo*, 22. 5-10. 3 figs. [See also *I. B.* 9. 88].

By experiments with filtrate passed through Chamberland L2 and L3 candles, the authors were able to reproduce the disease in sheep. This condition was noted in Argentina in 1932. *Fusiformis necrophorus* was frequently found as a secondary invader in the natural lesions.—A. H. HUNTER.

I. GORET, P., & LELANDIS, E. (1938). De l'utilisation des caillots de sang issu d'animaux hyperimmunisés. Emploi d'un extrait de caillot dans la maladie de Carré. [**Dog Distemper. The Value of Extracts of Coagulated Blood from Hyperimmune Animals**].—*Bull. Acad. vét. Fr.* 11. 211-216. [9 refs.]

II. DARRASPEN, E., FLORIO, R., & MEYMANDI, M. (1938). Des hépatonéphrites aiguës dans la maladie de Carré. [**Inflammation of the Liver and Kidneys in Dog Distemper**].—*Rev. Méd. vét., Toulouse*. 90. 241-269. [Num. refs.]

I. In order to secure the maximum yield of antibodies from immune serum, the clot obtained from the blood of dogs hyperimmunized against dog distemper was treated with a NaCl solution for 24 hours and the liquid removed by centrifugation. Titration experiments showed that this fraction, in doses of 1 c.c., protected ferrets against not less than 1,000 M.L.D. of virus.

The authors treated 28 dogs showing early symptoms of distemper, with doses of 20 c.c. (10 c.c. subcutaneously, and 10 c.c. intramuscularly): 16 made a complete recovery. In many instances there was a rapid amelioration of symptoms.

II. The authors give a general review of the secondary complications of canine distemper, with particular reference to the symptoms, diagnosis and treatment of toxic jaundice and acute nephritis.—R. E. GLOVER.

BELMONDO, C. (1936). Dell'influenza del cavallo nell' Eritrea. [**Equine Influenza in Eritrea**].—*Clin. vet., Milano*. 59. 196-199.

An outbreak of influenza [? pink eye] amongst horses and mules began with marked rise of temperature, followed by loss of appetite and marked general debility. Complete recovery followed in 10-12 days.

While attending these animals B. contracted influenza, as he did when attending an outbreak on a previous occasion. He suggests that equine influenza is transmissible to human beings.—S. F. J. HODGMAN.

KREMBS, J. (1938). Histopathologie der Ferkelgrippe. [**Histopathology of Piglet Influenza**].—*Arch. wiss. prakt. Tierheilk.* 73. 887-898. 9 figs. [16 refs.]

The disease described is said to be distinct from, but similar to, the swine influenza described in the U.S.A. and Germany. It affects piglets less than four weeks old. It is a very serious disease, and during the year 1933-1934 is said to have accounted for a loss of 140-145 million Reichmarks. Although the mortality is only 4-10%, animals which recover develop badly.

The most characteristic lesions occur in the lungs as a peribronchitis leading to a catarrhal or purulent broncho-pneumonia, with associated areas of local emphysema, and collapse. In addition, there occurs a diffuse catarrhal enteritis, with acute lymphadenitis of the bronchial and mesenteric lymph nodes, non-purulent lymphocytic encephalitis and meningitis and hyperplasia of the splenic lymphoid tissue.

It would appear that the virus enters the respiratory tract, spreads throughout the lung, and then travels by the lymph vessels to the lymph nodes, and finally reaches the blood, which conveys it to the other organs. Although the lesions cannot be regarded as pathognomonic they are usually sufficiently characteristic for differential diagnosis.—E. G. WHITE.

I. SCHERP, H. W., FLOSDORF, E. W., & SHAW, Dorothy R. (1938). **Survival of the Influenzal Virus Under Various Conditions.**—*J. Immunol.* 34. 447-454. 3 tables. [8 refs.]

II. TRILLAT, A., & BEAUVILLAIN, A. (1937). Essai de transmission aérienne de la grippe au furet par voie pulmonaire ou oculaire. [**Attempt at Aerial Transmission of Influenza to the Ferret by the Pulmonary and Ocular Routes**].—*C. R. Acad. Sci., Paris*. 205. 1186-1188. [5 refs.]

I. For the preservation of influenza virus infective mouse lung material was found to be unsuitable, since the virus died out in relatively short periods. Much better results were obtained with tissue-culture virus. The authors favour the method of drying by the lyophile process [see p. 848.], in the presence of gum acacia. The latter is essential in order to counteract the excessive alkalinity which is liable to develop owing to the loss of CO<sub>2</sub> during drying.

II. Dried ferret virus was made into a very fine suspension which was discharged into the air contained in an enclosed box. In one experiment ferrets were allowed to inspire the contaminated air, while in another the virus was allowed to come into contact with their ocular membranes only. In each instance the animals presented typical symptoms of influenza, and those which were allowed to recover developed immune bodies in their blood sera.—R. E. GLOVER.

CRAIGIE, J., & WISHART, F. O. (1934). **The Agglutinogens of a Strain of Vaccinia Elementary Bodies.**—*Brit. J. exp. Path.* 15. 890-898. 5 tables. [6 refs.]

The authors obtained antivaccine serum from rabbits by cutaneous or intravenous vaccination with vaccinia elementary bodies [E.B.]. On studying this

antiserum they found that it contained two distinct antibodies, one of which was absorbed by heated E.B. and the other only by unheated E.B. This they attribute to the presence of two agglutinogens in E.B. suspension: one was heat-labile at about 56°C., and is named L, while the other was not labile below 95°C., and is named S. This is illustrated by agglutinin absorption tests carried out by the authors.—J. E.

- PARKER, R. F., & RIVERS, T. M. (1935). **Immunological and Chemical Investigations of Vaccine Virus. I. Preparation of Elementary Bodies of Vaccinia.**—*J. exp. Med.* **62**. 65-72. 1 fig. on plate. [11 refs.]
- HUGHES, T. P., PARKER, R. F., & RIVERS, T. M. (1935). **Immunological and Chemical Investigations of Vaccine Virus. II. Chemical Analysis of Elementary Bodies of Vaccinia.**—*Ibid.* 349-352. 1 table. [9 refs.]
- PARKER, R. F., & RIVERS, T. M. (1936). **Immunological and Chemical Investigations of Vaccine Virus. III. Response of Rabbits to Inactive Elementary Bodies of Vaccinia and to Virus-Free Extracts of Vaccine Virus. IV. Statistical Studies of Elementary Bodies in Relation to Infection and Agglutination.**—*Ibid.* **63**. 69-94, and **64**. 439-452. 3 figs., 12 tables. [Numerous refs.]
- PARKER, R. F., & SMYTHE, C. V. (1937). **Immunological and Chemical Investigations of Vaccine Virus. V. Metabolic Studies of Elementary Bodies of Vaccinia.**—*Ibid.* **65**. 109-120. 5 tables. [15 refs.]
- PARKER, R. F., & RIVERS, T. M. (1937). **Immunological and Chemical Investigations of Vaccine Virus. VI. Isolation of a Heat-Stable, Serologically Active Substance from Tissues Infected with Vaccine Virus.**—*Ibid.* 243-249. [14 refs.]

I. Rabbits were inoculated intravenously with three doses of washed E.B., prepared by the differential centrifugation of scrapings from the dermal lesions of vaccinia in an angle centrifuge. The sera developed agglutinins to E.B. specifically to titres of from 1:128 to 1:512. The supernatant fluid from the centrifuged material contained a soluble substance which was precipitated by the same sera in dilutions of from 1:32 to 1:64.

II. Suspensions of E.B., frozen and dried *in vacuo*, were subjected to the standard tests for proteins, fats, sugars, etc. The results showed that about 80% of the bodies were protein in nature, fat formed 6.5-10%, while the carbohydrate content varied from 4% to less than 1%. Subsequent experiments showed, however, that a large proportion of the sugar had been lost by the repeated washing of the E.B. prior to the chemical analysis.

III. Rabbits were immunized with E.B. suspensions inactivated either by formaldehyde (0.3%) or by boiling for two hours. Rabbits received a six-weekly course of injections by the intraperitoneal route. All the sera developed agglutinin and precipitin antibodies. On the other hand, very little evidence of neutralizing antibodies could be detected, although some of the rabbits were subsequently found to be moderately resistant to the intradermal inoculation of fresh virus.

IV. Methods are described for the estimation of the numbers of E.B. in suspension in buffered solution. Highly constant and reproducible results were obtained by direct counts, by the Gates densitometer, and by the intradermal inoculation of susceptible animals with minimal infective doses. The results are analysed statistically.

V. Suspensions of washed E.B. were utilized to investigate the metabolism of a purified virus. The Warburg apparatus was employed for the determination of the consumption of oxygen and production of acid. Even when large amounts

of virus were used, the quantities of oxygen consumed and of  $\text{CO}_2$  liberated were very small; moreover, they took place within the first hour. These findings are in sharp contrast to those recorded with resting bacteria.

VI. Hyperimmune flocculating sera were prepared against the S and LS antigens of vaccinia [see previous abstract]. L serum was obtained by absorbing the LS serum with the S antigen.

A stable substance was isolated from infected tissues in a relatively pure state. It was precipitated by the S serum in high dilution, but not by the L serum. This antigen contained 16.5% nitrogen and was therefore regarded as almost pure protein, but as it also gave a strong Molisch reaction it undoubtedly contained traces of carbohydrate.—R. E. GLOVER.

- I. MACFARLANE, M. G., & SALAMAN, M. H. (1988). **The Enzymic Activity of Vaccinial Elementary Bodies.**—*Brit. J. exp. Path.* **19**. 184-191. 4 tables. [Numerous refs.]
- II. AMIES, C. R. (1988). **The Production of Homogeneous Suspensions of Vaccinia Elementary Bodies and the Histology of the Associated Skin Lesions.**—*J. Path. Bact.* **47**. 205-222. 10 figs. on 4 plates, 1 table. [Numerous refs.]
- III. PARKER, R. F. (1988). **Statistical Studies of the Nature of the Infectious Unit of Vaccine Virus.**—*J. exp. Med.* **67**. 725-798. 5 figs., 5 tables. [18 refs.]
- IV. NELSON, J. B. (1988). **The Behaviour of Pox Viruses in the Respiratory Tract. The Response of Mice to the Nasal Instillation of Vaccinia Virus.**—*Ibid.* **68**. 401-412. 5 figs. on 1 plate, 5 tables. [9 refs.]
- V. PICKELS, E. G., & SMADEL, J. E. (1988). **Ultracentrifugation Studies on the Elementary Bodies of Vaccine Virus. I. General Methods and Determination of Particle Size.**—*Ibid.* 588-606. 7 figs., 1 table. [Numerous refs.]
- VI. SMADEL, J. E., PICKELS, E. G., & SHEDLOVSKY, T. (1988). **Ultracentrifugation Studies on the Elementary Bodies of Vaccine Virus. II. The Influence of Sucrose, Glycerol and Urea Solutions on the Physical Nature of Vaccine Virus.**—*Ibid.* 607-627. 5 figs., 1 table. [18 refs.]

I. Highly purified suspensions of vaccinia E.B. obtained by the differential centrifugation of a dermal rabbit strain were tested for the presence of various enzymes. Dehydrogenase activity was detected by the Thunberg technique using various dyes of the indophenol series, with negative results in all cases. Phosphatase and catalase activity, on the other hand, were positive in every sample which was tested. The possibility that soluble enzymes are adsorbed on the virus particle is discussed.

II. The nature of E.B. was determined by photographing suspensions in the Svedberg equilibrium centrifuge [*V. B.* **9**. 124.], and by dark-field examination. Dermal suspensions from rabbits inoculated with sheep lymph showed particles of varying size, whereas after serial passage through the rabbit, very homogeneous suspensions were produced.

Monodisperse E.B. suspensions, stored for 120 days, became polydisperse, although still producing good dermal lesions in rabbits. It is suggested that stored E.B. flocculate and then slowly dissociate into particles of a smaller molecular weight.

The histological changes produced by crude pulp were similar in type to those induced by E.B., but differed in degree. Cytoplasmic inclusions were scanty in the former, but were a conspicuous feature of the latter: moreover, there was a considerable reduction in the amount of infiltration following inunction with E.B. as compared with polydisperse suspensions.

III. Various suspensions of vaccinia virus (tissue culture, testicular vaccine, etc.) were inoculated intradermally into rabbits in dilutions which were closely spaced and approaching the minimum infective dose. The results, examined statistically, seemed to show that a single virus particle was capable of inducing infection.

IV. Mice were successfully inoculated with vaccine E.B. by intranasal instillation under ether. The mortality was from 84% to 72%, death being primarily due to an advanced pneumonia. Mice which developed symptoms but recovered were subsequently immune. The disease was readily transmitted by the intranasal route, but not communicable by cohabitation. The distribution of the virus in the nasal passage, lungs and blood is described.

V. Suspensions of E.B. were centrifuged in the air-driven apparatus of BAUER and PICKELS [see p. 349.], and photographed by the Svedberg light absorption method. In a properly prepared monodisperse system a characteristic primary boundary was formed, frequently accompanied by several rapidly moving secondary boundaries. Irregular results were sometimes observed and were probably caused by auto-agglutination of the bodies in the region of this boundary. These studies suggest a particle diameter of the virus of 236-252  $m\mu$ .

VI. Suspensions of E.B. in varying concentrations of sucrose, glycerol and urea solutions were subjected to ultracentrifugal studies. Variations in the sedimentation rate were observed indicating changes in the density of the particle size. The theory that the E.B. increase in density as a result of osmotic extraction of water is discussed.—R. E. GLOVER.

PIZZETTI, G. (1937). Sulla attività patogena del virus della peste aviare e sul suo potere cancerolitico. [**Pathogenic Action of Fowl Plague Virus**].—*Profilassi*. 10. 69-70.

A brief account of work already published [*I. B.* 8. 365].

KNAJTNER, S. (1938). O djelovanju natrijeve lužine, kaporita i formalina na virus difterije i boginja peradi. [**Action of Caustic Soda, Caporit and Formalin on the Virus of Fowl Pox**].—*Jugoslov. vet. Glasn.* 18. 61-66. 2 tables. [18 refs.] [German summary].

K. concluded that filtered fowl pox virus was killed by a 0.1% solution of caporit in five minutes, and unfiltered virus in 30 minutes. When exposed to a 0.1% solution of formalin, the former was destroyed in five minutes, and the latter in one hour. Filtered virus became inactive in contact with a 1% solution of NaOH within five minutes, but when unfiltered it remained alive even after two hours. Hence he considers that both caporit and formalin are preferable to caustic soda as disinfectants for fowl pox virus.—B. OSWALD (KRIŽEVCI).

POLLARD, A. (1938). **The Chemical Composition of the Active Agent of the Rous Sarcoma No. 1**.—*Brit. J. exp. Path.* 19. 124-129. 4 tables. [18 refs.]

P. describes a method for collecting the agent of Rous sarcoma No. 1 by the use of the Sharples centrifuge and its further purification by fractional centrifugation. It was found that purified suspensions contained about 40% lipid material and about 15% nitrogen. Extraction of desiccated tumour tissue with benzene, ether, chloroform and other solvents yielded residues capable of producing tumours, and from which the active agent could be separated by fractional centrifugation. These preparations contained much less lipid material, but there was no relation between the lipid content and the activity. P. concludes that purified preparations of the agent consist mainly of protein with a small amount of lipid material.

—J. E. WILSON.

CLAUDE, A. (1988). **Concentration and Purification of Chicken Tumour I Agent.**—*Science*. **87**. 467-468. [7 refs.]

C. describes a method of preparing a Tumour I agent which exhibits a higher tumour-producing power than the original tumour. The method consists in serial extractions from frozen tumour tissue and subsequent purification of the extracts in a high speed centrifuge. The purified fraction obtainable from 1 g. of fresh tissue was about 2.2 mg. The chemical properties of the active agent are discussed in detail. It was not determined whether the lipoid material present was related to the tumour-producing property, but it is suggested that nucleic acid may be an important constituent of the agent. The presence of an inhibitory factor is discussed.—J. E. WILSON.

FURTH, J., & BREEDIS, C. (1987). **Attempts at Cultivation of Viruses Producing Leukosis in Fowls.**—*Arch. Path.* **24**. 281-302. 6 figs., 18 tables. [Numerous refs.]

The authors investigated the conditions necessary for the propagation *in vitro* of certain leucosis- and tumour-producing viruses. Previous work is discussed and methods employed are detailed. It was shown that virus 1, which is capable of setting up erythroleucosis and myeloid leucosis, could be cultivated by growing the cells produced by it (myeloblasts from bone-marrow, etc.) on solid and fluid media. Myeloblasts remained viable in culture up to 62 days, and all cultures in which they were present produced leucosis. In one experiment, myeloblasts disappeared from culture during the first few weeks and only fibroblast-like cells remained; these failed to produce leucosis. It was found that virus 1 did not survive in the presence of sarcoma cells.

In experiments with virus 13, which was capable of producing both leucosis and sarcomata, sarcoma cells from a breast muscle tumour of this type were grown *in vitro* for 158 days. Inoculations with cultures showed that this dual property had not been lost and that the virus had a stimulating effect on primitive blood cells and fibroblasts. The virus did not survive in the presence of normal fibroblastic cells of embryonal and adult tissue. After the first passage leucocytes disappeared and cultures were composed of fibroblastic-like cells which were capable of producing leucosis and osteochondrosarcoma. Osteogenesis was not observed *in vitro*. Virus 12 which produced osteochondrosarcoma and lymphomatosis was also studied.

The authors conclude that oncogenic viruses multiply *in vitro* only in the presence of cells on which they confer neoplastic properties.—J. E. WILSON.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

CURSON, H. H., & NEITZ, W. O. (1987). **The Approximate Distribution of the Genus *Glossina*.**—*Onderstepoort J. vet. Sci.* **9**. 101-104. [6 refs.]

The compilation of the map accompanying this paper arose from a desire to demonstrate at a glance to veterinary students the approximate distribution of the genus *Glossina*. No map could be discovered giving the information in this form. An appeal for data was made to the administrations of the various territories concerned, and there was a generous response. Even within the area showing the distribution of the genus *Glossina* there are regions, e.g. in the Gold Coast and Camerouns, from which tsetse flies are absent and where cattle abound. The geographical distribution as shown in the accompanying map is at least as satisfactory as in any previous one.—E. M. ROBINSON.

- LLOYD, H. M. (1938). **The Occurrence of *Glossina morsitans* in Tanganyika Territory in Vegetational Types other than the *Isoperlina-Brachystegia* Communities.**—*Bull. ent. Res.* **29**. 77-98. 3 text figs., 10 figs. on 2 plates, 8 tables. [17 refs.]

The classical habitat of *Gl.m.* is an *Isoperlina-Brachystegia* community (miombo). The fly has occasionally been reported from other vegetation types, however. A study of relations to some of these unusual habitats, in north and north-east Tanganyika during part of 1933 and 1935, showed that the species apparently inhabits several types of plant community other than miombo. Sixteen types are described, in 11 of which flies were found. Five of these are regarded as favourable to the fly. The species was also caught in abandoned banana plantations which were reverting to the natural state, but it was demonstrated by experiment that the fly disliked cultivated plantations.—J. MACLEOD.

- CAMPBELL, T. G. (1938). **Recent Investigations on the Buffalo Fly (*Lyperosia exigua* de Meijere) and its Parasites in North Australia.**—*J. Coun. sci. industr. Res. Aust.* **11**. 77-82. 3 tables, 1 map. [2 refs.]

No evidence was obtained that the buffalo fly had been affected in its incidence or its effect upon stock by the introduced parasite *Spalangia sindica*. All parasites recovered and identified in 1936 were of the local species *Sp. orientalis*; thus it would seem that the introduced species either failed to survive or was submerged by interbreeding with the indigenous form.—D. A. GILL.

- RAY, H. M. (1938). **Tick Fever in Domesticated Animals in India.**—*Agric. Live-Stk India*. **8**. 347-360. 19 figs. on 1 plate.  
An article written for laymen.—L. E. HUGHES.

- LARSON, C. L. (1937). **The Tick Parasite *Ixodiphagus texanus* in Nymphs and Larvae of *Ilaemaphysalis leporis-palustris* in Minnesota.**—*J. Parasit.* **23**. 496-498. [11 refs.]

L. speaks of attempts to control ticks by means of parasites to which they are subject and deals with two of them, both chalcids, *I.t.* and *Hunterellus hookeri*. He discusses the incidence of these parasites in ticks. A number of larval ticks showed definite external changes associated with the parasitism.

- BARTELS, & ROSENBERGER. (1937). **Neuere Massnahmen zur Bekämpfung der Schafräude. [New Control Measures for Sheep Scab].**—*Dtsch. tierärztl. Wschr.* **45**. 273-281. 16 figs., 1 table, 1 graph.

An account of a campaign, more energetic than any previously carried out in Germany, in which all sheep in a particular area of heavy infection in North West Germany were submitted to a lime-sulphur dipping, steps being taken at the same time to isolate the area from contamination from outside. Eradication was achieved by this method.

Details of various types of dipping tanks and of the preparation of the dipping fluid are given.—J. E.

- TARANTINO, G. (1937). **Sulla caratteristica rogna delle zampe dei polli e sulla sua trasmissibilità all'uomo. [Scaly Leg in Fowls and its Transmissibility to Man].**—*Azione vet.* **6**. 835-838. [Numerous refs.]

After reviewing previous authorities on this disease in fowls, T. points out that it has been asserted by some, and denied by others, that it is transmissible to man. He made two experiments on himself, and two on other volunteers. Scales

were taken from badly infected fowls and were proved infective to other fowls. T. experimented first on one finger and then on an arm, the skin being previously scarified and the infected material being kept in contact in the one case for 15, and in the other for 20 days. There was not the slightest trace of any infection. The results in the other two volunteers were also negative.—S. F. J. HODGMAN.

- I. IWANOFF, X. (1937). Ueber die Verbreitung der *Linguatula serrata* unter den Hunden in Bulgarien. [*Linguatula serrata* in Dogs in Bulgaria].—*Z. InfektKr. Haustiere*. 51. 191-202. 1 table. [16 refs.]
- II. IWANOFF, X. (1937). Ueber die Verbreitung der Linguatulose unter den Ziegen in Bulgarien. [The Incidence of *Linguatula* in Goats in Bulgaria].—*Ibid.* 52. 79-84. 1 table. [8 refs.]

I. The author examined 450 dogs, varying in age from three months to 11 years, for *Linguatula* infestation. In all, over 40% of the dogs harboured the parasites, the degree of infestation running approximately parallel with the age of the animal. The youngest animal in which parasites were found was four months old. As many as 41 parasites were found in a single dog. Over 40% of the affected animals harboured only male or sexually immature parasites, so that examination of the nasal secretion might often fail to show the presence of the eggs.

II. The jejunal lymph nodes of 200 goats between 1-10 years old were examined for the presence of *Linguatula* larvae. The incidence of infestation (78%) was lower than in sheep (98%), and this is probably due both to the closer relation between the sheep and sheep dogs and to the grazing habits of sheep. As many as 60 living larvae were found in 1 g. of lymph node.—E. G. WHITE.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

- PEGREFFI, G. (1937). Lotta contro le malattie parassitarie del bestiame in Sardegna. (Nota preventiva). [Control of Helminth Infestations of Animals in Sardinia].—*Azione vet.* 6. 750-752. 1 table.

Details are given of the prevalence of various parasitic diseases of cattle in Sardinia, and the results of a three years' (1935-1937) official control campaign. The anthelmintics employed were distributed free of cost, the only charge made being a small one for the services of the veterinarians employed to examine and treat the infected animals. By far the largest number of treatments were for distomatosis in sheep. The results were considered encouraging.—S. F. J. H.

- I. PENSO, G. (1937). La calciocianamide nella lotta contro la distomatosi. [Control of Fascioliasis with Calcium Cyanamide].—*Clin. vet., Milano*. 60. 711-718.
- II. NEGRI, R. (1937). La calciocianamide nella lotta contro la distomatosi. [Control of Fascioliasis by Calcium Cyanamide].—*Profilassi*. 10. 227-229.

I. It was found that  $\text{CaCN}_2$  destroyed the ova, embryos and larvae of *Fasciola*, and also destroyed infested snails. At the same time it served as a valuable manure, and the cost was very low. The best effect was obtained by employing  $\text{CaCN}_2$  at the end of the winter, before the young animals were driven out to pasture. Quantities of 1-3 cwt. per 100 square metres represent 4-12 times the toxic doses for snails and developing *Fasciola*.

II. A mixture of  $\text{CaCN}_2$  with equal parts of powdered, sifted earth proved very poisonous for the intermediate snail host of *Fasciola*, and would also destroy

larvae of insect vectors. The cyanamide is dissolved by the soil and rain water and forms HCN and  $\text{Ca}(\text{OH})_2$ ; from these urea is formed, which is a useful artificial manure. The calcium cyanamide should be spread in winter and spring in quantities of 1-2 cwt to every 100 square metres.—HANS GRAF (ZÜRICH).

VILJOEN, N. F. (1987). **Cysticercosis in Swine and Bovines, with Special Reference to South African Conditions.**—*Onderstepoort J. vet. Sci.* 9. 387-570. 17 figs., 35 tables, 1 map, 4 charts. [Numerous refs.]

Extensive statistical records collected from South African abattoirs are used to study the distribution and incidence of measles in pork and beef in the country. The former reaches 25% and the latter is rarely more than 5%. Similar very extensive records have been obtained from most other parts of the world, and these are analysed.

About 80% of measly pig carcasses are heavily infested, but bovine infestations are usually light and require very thorough inspection for their detection. It has been found that the hind limbs and the hump of cattle are important predilection sites, and V. strongly advocates a deep cut into the adductor muscles, parallel to and just behind the pelvic symphysis, as well as a cut into the hump.

Viability tests performed during 12 months, by Keller's method, on a large number of carcasses and measles, showed that *C. cellulosae* in carcasses did not survive more than four days' freezing at approximately  $-10^\circ\text{C}$ ., and *C. bovis* similarly did not survive more than five days.

The incidence of human infection with both tapeworms in the native and European populations is relatively high in South Africa. Cases of psychosis due to tapeworm infestation are mentioned, while the occurrence of human epilepsy as a result of cerebral cysticercosis would appear to be more frequent than is generally known.

The epidemiological aspect of the problem is discussed and measures are suggested for control and eradication of the infection.—H. O. MÖNNIG.

MEIJER, W. C. P. (1987). Over een lintworm van hond en kat, *Diphyllbothrium (Spirometra) erinacei* (Rudolph, 1819) en het bijbehorende plerocercoid. [*D.e. of the Dog and Cat and its Plerocercoid*].—*Ned.-ind. Bl. Diergeneesk.* 49. 370-380. 1 fig. 7 tables. [12 refs.]

In the Dutch East Indies the plerocercoid of *D.e.* was found in human beings, frogs, rats, pigs and *Crocidura sp.* The full-grown tapeworm *D.e.* occurs in dogs and especially in cats, the latter becoming infested through eating frogs. The occurrence of *D. latum* in the Dutch East Indies has not yet been proved.

—JAC. JANSEN (UTRECHT).

MOULAERT. (1988). De la fréquence de la ladrerie chez nos animaux de boucherie. [*Incidence of Cysticercosis in Slaughter Animals in Belgium*].—*Echo vét., Gembl.* 67. 66-70. 1 table.

M. analyses the results of a systematic search for cysticercosis in all animals slaughtered in Bruges during the four years of the German occupation to November, 1918. One case of *C. cellulosae* of the pig and 154 cases of *C. bovis* in cattle were determined. No data upon which to assess the incidence of cysticercosis were available.—C. V. WATKINS.

OLSEN, O. W. (1988). **Anoplocephalasis in Minnesota Horses.**—*J. Amer. vet. med. Ass.* 92. 557-559. [11 refs.]

The discovery of 12 specimens of *A. magna* in a five-month-old colt is recorded.

Only five cases of anoplocephaliasis have been noted in Minnesota in the past 20 years, two of *A. magna*, and three of *A. mamillana*. *A. perfoliata* has not been recorded.

The life-cycle of these worms has not been completely demonstrated, but STUNKARD's work [V. B. 5. 359, and 8. 448.] suggests that an intermediate host is necessary.—D. D. OGILVIE.

SEN, S. C. (1936). **Development of Adult Taenia Echinococci in a Hydatid Cyst in the Muscle of a Sheep.**—*Calcutta med. J.* 31. 38-40.

S. reports the unusual finding of a cyst about the size of an acorn containing full-grown *T.e.*, in mutton bought in a Calcutta market.

YMAZ APPHATIF, I. L. (1937). Purificación de la toxina y anatoxina hidática. [Purification of Hydatid Toxin and Anatoxin].—*Prensa méd. argent.* 24. 1731-1733. [Copied *verbatim* from *Trop. Dis. Bull.* 35. 223-224. Signed H. H. S.]

When hydatid fluid is treated with trichloroacetic acid albumen is precipitated; this is separated quickly and redissolved in alkali. The acid precipitates, at pH 4 or lower, the toxalbumins and anatoxin, which are separated by centrifuging, redissolved in solutions of carbonate and phosphate of sodium and made up to the original volume by normal saline.

The author's technique for separating the hydatid toxalbumin is as follows:—

To the transparent hydatid fluid, pH 6.7, are added 4 drops of normal solution of trichloroacetic acid for each c.c. of fluid, the pH reduced to about 3, the product being then shaken and put aside for 10 minutes when a fine turbidity forms which is thrown down by centrifuging. The precipitate is dissolved in 0.9 per cent. NaCl with addition of 4 drops of normal  $\text{Na}_2\text{CO}_3$  and the pH becomes 6.5. The amount of saline employed is one-fifth of the hydatid fluid, so that the albumen is in a five-fold concentration.

For separation of the anatoxin:—

To 10 c.c. of the anatoxin of pH 6.3 are added 10 drops of normal trichloroacetic acid; the mixture shaken and in 10 minutes a suspension forms which is thrown down by centrifuge, redissolved in 0.9 per cent. NaCl (one-fifth of the original volume) and one drop of normal  $\text{Na}_2\text{CO}_3$ ; the product is purified and five-fold concentrated anatoxin with pH 6.6.

The supernatant fluid after centrifuging off the precipitate formed with the trichloroacetic acid is neutralized with normal  $\text{Na}_2\text{CO}_3$ , 2 drops for each c.c., and the resulting fluid, of pH 6.4, contains the saccharide fraction of the liquid.

The albuminoid fraction gives more intense intradermal reactions than does the pure hydatid fluid; the saccharide fraction also more than the pure fluid but less than the albuminoid fraction, in fact intermediate. Similarly the albuminoid fraction has a much higher specific antigenic potency than the saccharide fraction.

PORTER, D. A. (1937). **An Increase in the Proportion of Basophilic Leucocytes in Guinea Pigs Experimentally Infected with Swine Lungworms.**—*J. Parasit.* 23. 73-82. 8 figs. [7 refs.]

The larvae of swine lungworms were obtained from the oesophagus of the "most common earthworms in the U.S.A.", the stinking earthworm, *Helodrilus foetidus*, and fed in definite numbers to young uninfested g. pigs. All the worms recovered P.M. from the g. pigs were *Metastrongylus elongatus*. Differential leucocyte counts were made and details are given graphically of the fluctuations in the number of neutrophiles, lymphocytes and basophiles. The number of basophiles in the blood increased markedly after the infestations, the peak coming between the seventh and 17th days, but then quickly returned to normal. G. pigs killed and examined at this stage showed signs of having had worms in the lungs,

though none were actually recovered. It appears that the proportion of basophiles circulating in the blood and in the tissues of the lungs is directly correlated to the presence of the worms. It also seems possible that the proportion of basophiles may be directly proportional to the number of larvae fed, and that the percentage of these cells may not increase to the same extent following reinfestation, as they do after the initial infestation.

PRITCHETT, H. D. (1938). **Lung Worms in a Kitten.**—*J. Amer. vet. med. Ass.* **92**. 692-694. [2 refs.]

A fatal infestation with *Aleurostrongylus abstrusus* in a kitten is recorded. Acute fever and intermittent halitosis were noticed before death. Autopsy revealed lesions which were confined exclusively to the lungs, and which consisted of extensive chronic parasitic pneumonia with almost complete solidification, calcification around the parasites, and extreme thickening of the arterial walls. An adenomatous condition also occurred in some areas, the neoplastic cells originating in the bronchial epithelium.—D. D. OGILVIE.

ABDUSSALAM, M. (1938). **On the Occurrence of *Skrjabinema ovis* (Skrjabin, 1915) in India.**—*Proc. Ind. Acad. Sci.* **8**. 15-17. 1 table. [10 refs.]

A. describes two living specimens of *Sk.o.* passed in a speck of mucus by a sheep with diarrhoea. Their measurements compare with those of British and Russian specimens. The infested sheep was from an indigenous flock. It is stated that the infestation was probably introduced from Turkestan before the 19th century.—R. FISHER.

TAYLOR, E. L. (1938). Les gastrites parasitaires. Étude des larves de trichostrongylidés parasitaires dans les pâturages. [**A Study of the Larval Stage of Trichostrongyles on Pastures**].—*Bull. Off. internat. Epiz.* **16**. 181-194. Discussion pp. 281-284.

A proportion of larvae of trichostrongyles remain viable on pastures for as long as nine months. They are capable of penetrating 5 cm. beneath the surface under favourable conditions, and show some selectivity as to the type of herbage parasitized. Most infected pastures contain 200 larvae per lb. herbage, rising to 1,000-2,500 on very heavily infested areas. It is noted that the number of larvae ingested is inversely proportional to the quantity of the herbage available, close cropping causing heavy infestation. Animals of non-susceptible species, if allowed to graze on the pastures, reduce the number of larvae considerably.—P. S. WATTS.

ANDREWS, J. S. (1938). **Effect of Infestation with the Nematode *Cooperia curticei* on the Nutrition of Lambs.**—*J. agric. Res.* **57**. 949-961. 1 fig., 8 tables. [Numerous refs.]

The investigation shows that infestations with a relatively non-pathogenic nematode decrease the ability of infested lambs to convert their food into gain in weight, even when these lambs are in excellent nutritional condition and show no clinical symptoms of parasitic infestation. Evidence is presented to show that this decrease in efficiency is due to an increased energy metabolism, apparently resulting in reduced use of the food for growth or gain. This increased energy metabolism may be accounted for by the nervous excitation of the host due to the irritation of the intestinal mucosa by the worms in the intestine, by the production of areas of inflammation wherever the mucosa has been injured by the larvae and wherever a tissue reaction of the partially resistant host to the foreign protein of the parasite occurred, and by the possible, although undemonstrated, accumulation of guanidin in the blood of the infested lambs.—R. FISHER.

WEHR, E. E. (1987). **Observations on the Development of the Poultry Gapeworm *Syngamus trachea*.**—*Trans. Amer. micr. Soc.* **56**. 72-78. 16 figs. on 1 plate. [3 refs.]

According to the observations made by W., the embryo of *S.t.* moults twice in the egg and hatches as a third stage larva which is infective for chicks or earthworms, developing to an adult in the chick, and persisting as an infective third stage larva in the earthworm. The first moult in the egg takes place on the fifth day, and the second moult on the seventh day, in cultures incubated at a temperature ranging from 24°-30°C.

W. fed chicks with embryonated eggs (containing third stage larvae) or with infected earthworms, and examined them after various intervals.

Third stage larvae were found in the liver and lungs of one bird, and fourth stage larvae in the lungs of others. It was also observed, in further experiments, that young adult worms appeared in the lungs and copulated there before migrating to the trachea.

The six stages of the life-cycle are described and illustrated.—J. E.

PROMMAS, C., & DAENGEVANG, S. (1987). **Feeding Experiments on Cats with *Gnathostoma Spinigerum* Larvae Obtained from the Second Intermediate Host.**—*J. Parasit.* **23**. 115-116. 2 figs.

Attempts were made to determine the kinds of freshwater fish that might act as second intermediate hosts of *G.s.*, and also to infect the definitive host with larvae obtained from the second intermediate host.

Young freshwater fish (*Ophicephalus striatus*) were experimentally infested with *G.s.* larvae, and three cats were later fed grown, non-encysted larvae from these fish. By faecal and P.M. examination 180 days after feeding, one cat was proved not to be infested. The second cat proved to be infested on faecal examination 223 days after feeding, and 89 days later P.M. examination revealed a nodule in the gastric wall containing two adult females and one adult male worm. The third cat proved to be infested on faecal examination 198 days after feeding, and P.M. examination 66 days later revealed a tumour in the stomach wall containing four adult males and four adult female worms.

The authors describe the life-cycle of *G.s.* as demonstrated by these studies.

- I. STRONG, R. P. (1988). **Onchocerciasis in Africa and Central America.**—*Amer. J. trop. Med.* **18**. Suppl. to No. 1. 1-57. 44 figs., 2 tables. [Numerous refs.] [See also *V. B.* **8**. 446].
- II. SANDGROUND, J. H. (1988). **Helminthological Observations and their Bearing on Certain Aspects of the Biology of *Onchocerca*.**—*Ibid.* 91-107. 4 figs., 1 table.

I. Further studies carried out in Africa regarding onchocerciasis are reported. Observations were made particularly in the provinces of Lusambo and Elisabethville, and in Northern Rhodesia. A comprehensive survey of onchocerciasis of the native population was made. The incidence of infection was very high, probably over 95%.

Infected human beings constitute the most important focus of infection, and eradication of the disease is difficult. S. considers that measures against the larvae and pupae of *Simulium* can only be partially successful; and more can be accomplished by surgical or medical treatment of infected persons. A number of animals were examined to discover whether another mammalian host exists, and it seems possible that a species of antelope, and also cattle, may occasionally act as reservoir hosts in some areas.

He emphasizes the importance of the discovery of free adult parasites in man, and suggests that human species of *Onchocerca* may occur in the ligamentum nuchae and tendons as in horses, cattle and other mammals. Further autopsies are necessary before a more definite opinion can be given.

II. The lack of morphological difference between the various species of *Onchocerca* is stressed; it is consequently not clear whether the species are host-specific or not. In Africa the specificity of bovine onchocerciasis is by no means as clear as in other regions. Enquiry was made, therefore, into the possibility of ruminants being a source of human onchocerciasis in Africa, and also into the more exact bionomics of the parasites.

Few cattle are maintained in the area examined, and onchocerciasis was absent from the one large herd of the district; village goats, also, were free from infection. However, in wild buffaloes (*Syncerus caffer*) about 200 miles away, *O. syncerus*, a new species, was discovered in the loose areolar tissue near the cervical ligamentum nuchae. The new species is described and differentiated from *O. gutturosa* to which it appears closely related. *O.g.* is recorded from one of the buffaloes, and also the related nematode *Elaeophora poeli*. The examination of numerous other wild mammals failed to reveal evidence of onchocerciasis.—D. D. OGILVIE.

- I. FAUST, E. C. (1937). **Mammalian Heart Worms of the Genus *Dirofilaria*.**—*Festschrift Bernhard Nocht, 1937*. 131-139. 1 fig., 1 table. [Numerous refs.] Hamburg: Friederichsen, de Gruyter & Co. [In English].
- II. FENG, L. C. (1937). **Attempt to Immunize Dogs against Infection with *Dirofilaria immitis* Ledy 1856.**—*Ibid.* 140-142. [8 refs.] [In English].
- III. LIVE, I., & STUBBS, E. L. (1938). **The Diagnosis of Filariasis in the Dog.**—*J. Amer. vet. med. Ass.* 92. 686-690. 1 table. [3 refs.]
- IV. YEN, C. H. (1938). **Studies on *Dirofilaria immitis* Ledy, with Special Reference to the Susceptibility of some Minnesota Species of Mosquitoes to the Infection.**—*J. Parasit.* 24. 189-205. [13 refs.]
- V. LANE, C. (1938). **Drug-Induced Sterility of Female Filarial Worms.**—*Vet. J.* 94. 158-161. [4 refs.]

I. A collection of *Dirofilaria* species made in China and in New Orleans from the dog, cat, wolf, fox, and California sea-lion is discussed.

*D.i.* occurred frequently in dogs. Quantitative microfilarial studies confirmed that the type of curve representing the numbers of microfilariae present in peripheral blood at different times over 24 hours is essentially the same as previously reported in the literature; but they were in disagreement with the contention that the periodicity curve is relatively constant, since there was considerable variation in the time at which the low and the high phases of the curve were reached.

In cats there was a greater tendency for *D.i.* to migrate into the pulmonary arteries, the parasite even invading the respiratory passages.

Morphological differences between *D. repens* of the sea-lion and the other members of the genus are noted, and it is proposed that this species be placed in the sub-genus *Nochtiella*, *D. immitis*, *D. magalhaesi*, *D. pongoi* and *D. spirocauda* (vel *immitis*) becoming members of the sub-genus *Dirofilaria*.

II. Two experimental dogs were injected subcutaneously with a 10% emulsion of adult *D.i.* One received two injections of 1 c.c. of male worm emulsion each week for ten weeks, and was then inoculated (subcut.) with nine mature larvae; *D.i.* were found in the heart eight months later. The other dog received 89 doses each of 1 c.c. of female worm emulsion. Towards the end of the course of injections the test dose was given. The dog died two months after the end of the injections, and no worms were detected on autopsy. An immunized control

was given infective larvae and became infested in the same degree as the animal treated with emulsion of male worms. F. considers, therefore, that the possibility of complete immunization against *D.i.* by this method is still remote.

III. The efficiency of concentrating microfilariae in blood sera and in whole blood was compared.

From 5 c.c. of whole blood, 0.5 c.c. was immediately mixed with 5 c.c. of 5% glacial acetic acid. The remainder of the blood was allowed to coagulate and 0.5 c.c. of its serum was mixed with a further 5 c.c. of acetic acid. Examination after centrifuging showed that there were more than twice as many microfilariae in the serum than in the equal volume of whole blood. For the diagnosis of filariasis, therefore, the use of blood serum in preference to whole blood is advocated.

IV. Experiments have shown that not all mosquitoes are suitable intermediate hosts for *D.i.* The susceptibility of some Minnesota species was therefore tested, care being taken to trace the development of the microfilariae in each species. *Aedes stimulans*, *A. cinereus*, *A. canadensis*, *A. vexans*, *Anopheles punctipennis*, and *An. maculipennis* proved very susceptible to infection. *Culex tarsalis*, *C. territans*, and *C. pipiens*, however, had a low susceptibility, and *A. triccittatus*, *Theobaldia inornata*, and *Taeniorhynchus perturbans* gave negative results under laboratory conditions.

Accounts are given of the method of escape of the larvae from the labium of the mosquito, the tissue changes in the infested insect, and also of the encapsulation of the parasite; the capsule being pigmented.

V. It has been shown that the rise of the periodic microfilarial blood tide in filarial infestations is due to synchronized parturition by the female worms. Death or sterilization of the latter relieves the host. Concentrated foudin given in doses of 0.45 c.c. to 1 c.c., rising to 0.9 c.c. to 2 c.c., on alternate days to dogs infested with *D.i.* sterilized all and killed some of the female worms. Small increases in dosage caused dangerous toxic manifestations.—D. D. OGILVIE.

## IMMUNITY

DOIG, A. T., GEMMILL, G., KAYNE, G. G., LINGGOOD, F. V., PARISH, H. J., & WESTWATER, J. S. (1988). **Laboratory and Clinical Investigations on Tuberculin Purified Protein Derivative (P.P.D.) and Old Tuberculin (O.T.)**—*Brit. med. J.* May 7th. 992-997. 7 tables. [Numerous refs.]

In order to produce a highly active but non-sensitizing tuberculin, the authors use Seibert's "SOTT", i.e., synthetic medium old tuberculin purified by filtration through collodion membranes and precipitated with trichloroacetic acid. The precipitate is dried by ether and is then in stable powder form of quite consistent potency. It is issued as the powder together with borate buffer solution as solvent, standardized to equal various strengths of old tuberculin. It was found by clinical trials on man that the g. pig was quite suitable as a test subject for standardization and gave comparable results to those in man.—P. S. WATTS.

POCHON, J. (1988). **Recherches sur la floculation des sérums anticharbonneux. [The Flocculation of Anti-Anthrax Sera].**—*Rev. Immunol.* 4. 457-468. 1 table, 5 graphs. [Numerous refs.]

Flocculation phenomena were studied using mixtures of increasing volumes of two anti-anthrax sera with 1 c.c. of filtrate from two-, five- and eight-day-, and one- and two-month-old broth cultures of two capsulated and three non-capsulated anthrax strains. The double-zone flocculation obtained with young capsulated

cultures is graphically illustrated by two fused curves which become separate parabolas with older cultures. The tubes of earliest flocculation for the filtrates of different age against the same serum could be graphically represented by two equilateral hyperbolas. A single parabola was obtained for all filtrates of non-capsulated strains. The preparation of the various antigenic fractions and the type of flocculation obtained with them are described. A table demonstrates the inconstancy, during immunization, of the relation between the amounts of somatic and of capsular antibodies in the serum.—R. O. MUIR.

WEINBERG, M., & GUILLAUMIE, M. (1938). Titrage des sérums antigangréneux (anti-*perfringens* C, anti-*perfringens* D, anti-histolytique et anti-vibrien septique). [The Titration of Antisera to *Clostridium welchii*, *Cl. histolyticum* and *Cl. septique*].—*C. R. Soc. Biol. Paris*. 127. 1084-1088. 2 tables. [1 ref.]

Six anti-*welchii* sera of Types C and D gave inconstant results when titrated against units consisting of 20 M.L.D. of various homologous toxins. A Danish and a French standard serum were both suitable for establishing a test dose of *Cl. histolyticum* toxin. A maximum difference of 15%, occurred in titrations of a *histolyticus* antiserum, with test doses of different *histolyticus* toxins, and differences of 10-20% were obtained in titrations of a *septique* antiserum with test doses of four homologous toxins.—R. O. MUIR.

FITCH, C. P., ROEPKE, M. H., & THOMPSON, C. M. (1937). Studies of Physical Properties and Agglutinability of *Br. abortus* Plate Antigens from Several Sources. II.—*Cornell Vet.* 27. 366-373. 6 tables. [4 refs.] [See also *V. B.* 7. 211].

Further studies of plate antigens obtained from commercial manufacturers and official laboratories showed that wide variations still existed in their physical properties and agglutinability. As in the previous examinations, the colour, relative viscosity, surface tension, and bacterial concentration of the antigens were determined, and the relative sensitivity was calculated. Antigens obtained from the same sources as those tested 16 months previously showed a marked change in sensitivity in a number of cases, but fewer relative differences in the same batch. Uniform methods of production and use would simplify and increase the efficiency of Bang's disease control plans in the various States.—S. J. GILBERT.

GINS, H. A., KROEMER, G., & LINK, T. (1938). Untersuchungen über die ersten Reaktionsabwehrerscheinungen in der infizierten Haut. [The First Defence Reactions of the Infected Skin].—*Zlb. Bakt. I. (Orig.)*. 142. 225-250. 12 figs. [7 refs.]

Observations were made on the reaction of the skin of normal and immunized g. pigs to the intradermal injection of bacteria, diphtheria toxin and vaccinia virus. Histological sections of the skin were prepared from samples at varying intervals after the injection. Vascular changes at the site of injection were observed as early as half an hour after the injection: they comprised leucocytosis with diapedesis and the formation of a perivascular cellular infiltration. It is suggested that the cellular response as seen in and around the vessels cannot be explained on the basis of chemotaxis, but appears to result from a central effect: whether this is brought about by the central nervous system, by hormones, or by other means is not known. Phagocytosis is to be regarded as a non-specific reaction, although different types of leucocyte are involved according to the organism concerned. In immunized animals there was both increased phagocytosis and an increased effect on the injected organisms by substances present in the tissue fluids. No

support was obtained for the view that certain cells of the reticulo-endothelial system are the bearers of specific immunity.—E. G. WHITE.

KUROTSCHKIN, T. J., & BENARADSKY, C. V. (1988). **Serological Diagnosis of Contagious Bovine Pleuro-Pneumonia Through the Use of the Specific Carbohydrate of *Asterococcus mycoides***.—*Chin. med. J.* Suppl. No. 2. pp. 269-278. 1 table. [6 refs.] [In English].

From cultures of the organism of contagious bovine pleuro-pneumonia, the authors obtained a specific carbohydrate substance which reacted with sera from rabbits immunized with whole cultures of the organism. It was found that this carbohydrate substance was liberated into the blood in natural cases of the disease, and it could be detected by a precipitin ring test which developed when immune rabbit serum was added to the blood of the bovine host. Antibodies could also be demonstrated in the blood against this substance.

The authors consider that the absence of immunity in the case of certain recovered animals may be due to the neutralization of the antibodies by circulating specific carbohydrate substance.—D. L. HUGHES.

MAGARA, M. (1936). Sur l'action de l'hormone sexuelle contre l'infection. [**The Part Played by Sex Hormones in Resistance to Infection**].—*C. R. Soc. Biol. Paris*. 121. 1198-1194.

M. investigated the influence of sex hormones on immunity to pneumococcal infections in mice. Experiments showed that male hormones exerted a defensive action specific to male mice as do female sex hormones in female mice.

HÖRING, F. O. (1937). Endokrine Krankheiten und Infektionsresistenz. [**Relation Between the Endocrine Diseases and Immunity**].—*Ergeb. inn. Med. Kinderheilk.* 52. 336-374. 17 tables. [Numerous refs.] [Abst. from abst. in *Bull. Inst. Pasteur*. 36. 40].

H. points out the indirect influence of hormones on resistance to infection, in that they affect the composition, metabolism and general properties of the blood and tissues. Work is required on the action of individual hormones in relation to particular infections. Epidemiological data, and a study of skin and pulmonary infections failed to prove any lowered resistance in subjects with endocrine diseases. However, it was noted that in such patients some diseases, e.g. *Streptococcus pyogenes* infection, tuberculosis, and *Bacterium coli* infection, were more severe than in patients in whom the endocrine system was normal.

## DISEASES, GENERAL.

- I. MÜSSEMEIER. (1988). Considérations sur la prophylaxie des épizooties qui peuvent être visées par une intervention administrative. [**Administrative Intervention in the Prophylaxis of Epizootics**].—*Bull. Off. internat. Epiz.* 16. 122-184. Discussion pp. 292-306.
- II. VERGE, J. (1988). Etude d'une réglementation sanitaire applicable à toutes les maladies susceptibles d'une intervention administrative. [**Sanitary Regulations Applicable to all Diseases Controllable by Legislation**].—*Ibid.* 185-148. Discussion pp. 292-306.

I. A review of the conditions under which administrative intervention is applicable to the control of epizootic disease in animals, and a consideration of the principles upon which legislation should be based. M. examines critically the

means at our disposal for the prevention and control of the most important epizootic diseases. He considers that under certain conditions a slaughter policy is justified for foot and mouth disease, contagious bovine pleuro-pneumonia, sheep scab, dourine, swine fever, rinderpest and equine infectious anaemia. He reviews the dangers and the permissibility of active immunization in diseases where this procedure is applicable. Aids in control, such as chemotherapy afford as yet little hope of success, except in certain protozoan and parasitic infections. M. concludes with a consideration of the responsibilities of stockowners regarding the adoption of general hygienic measures, and the means for their instruction.

II. A consideration on more general lines of most of the matter cited in the previous abstract. A list of the notifiable diseases in France is given, *viz* anthrax, bovine tuberculosis (of the lungs, intestine, udder and uterus), glanders, swine erysipelas and "pneumo-enteritis," ovine and caprine brucellosis, blackleg, dourine, bovine anaplasmosis, F. & M. disease, rinderpest, contagious bovine pleuro-pneumonia, sheep pox, equine infectious anaemia, rabies, psittacosis and mange. V. concludes by formulating certain principles by which veterinary police legislation should be guided for organizing obligatory, facultative and voluntary prophylaxis.—N. J. SCORGIE.

SCHÄPER, W. (1937). Allergie und Konstitution. [**Allergy and Constitution**]. —*Z. Zücht. B.* 139. 163-195. [Numerous refs.]

GENERAL.—S. surveys the field of comparative pathology in an attempt to point out the connexion between allergy and many diseases of domestic animals. He discusses the meaning of the terms allergy, anaphylaxis, serum sickness, idiosyncrasy and atopia, and suggests that they are all classifiable under the term allergy as defined (but modified by S. to have a wider scope) by VON PIRQUET in 1906, because they are forms of inherited "modified reactivity" to the action of antigens, which include foreign matter of any kind. Research on human beings has shown that a general allergic predisposition to a number of antigens is common in man and is perhaps inherited as a simple dominant character, though not all affected persons show signs of it (probably because some of them merely do not happen to be exposed to the antigen in question). S. prefers to apply to those antigens which bring about allergic diseases the term "allergens", and he specifies five postulates in connexion with their identification. [He breaks new ground in animal pathology by suggesting that the diseases mentioned below have an allergic origin. Direct supporting evidence is as yet very scanty, but indirect evidence concerning analogous human diseases is available and is referred to in the text].

He puts forward the following tentative and incomplete list of special allergic conditions in domestic animals:—

A. ALLERGIC SKIN DISEASES.—(a). "Rust" or "soot" of young pigs (an eczematous condition characterized by the formation of black crusts). (b). "Nutritional eczema" and eczema following the use of certain drugs. Numerous foodstuffs have been incriminated, *viz*, fish meal, milk, rice, potatoes, malt, grape skins, vine leaves, sesame, linseed, white mustard, hops, molasses, maize, buckwheat, clover, lucerne and sugar beet. (c). Laminitis of horses and cows: in this condition the "allergen" may be either a foodstuff, a "toxin" from an inflamed uterus, or a drug. (d). Urticaria or nettlerash, and Quincke's oedema: these are well known, and can be caused by a wide variety of "allergens"; horses are most commonly affected, and the condition is quite frequently observed in cattle and swine. (e). Purpura: this can be caused by many "allergens", and is usually a complication of severe infectious illness [sweetclover disease has been overlooked].

B. ALLERGIC EYE DISEASES.—Four such diseases are described :—“ summer harvest conjunctivitis and keratitis ” of horses, usually ascribed to direct injury by hay seeds, etc. ; periodic ophthalmia of horses ; sexual recurrent ophthalmia of mares, and periodic ophthalmia of piebald cattle.

C. METABOLIC DISEASES.—(a). Dyscrasias occurring in connexion with parturition and lactation. S. suggests that the group of diseases represented by milk fever, lactation tetany, puerperal eclampsia and allied conditions which occur in all the domestic mammals, have a genetical factor in their aetiology, though there is as yet little collected evidence to support this view. (b). Myoglobinuria and haemoglobinuria in horses and cattle.

D. BROKEN WIND IN HORSES.—It is suggested that there may be a hereditary predisposition which takes the form of imperfect elastic tissue in the lungs, or of an asthmatic tendency.—J. E.

WEIDLICH, N. (1937). Ueber Tierseuchen in Karpathenrussland. [*Animal Diseases in the Carpathians (Ruthenia)*].—*Prag. tierärztl. Arch.* 17. 219-227. 3 tables. [18 refs.]

A brief account of the population, climate, and soil, and of the methods of animal husbandry employed, is followed by an account of the infectious diseases of animals in the Carpathians. During the years 1932-1936, annual losses from anthrax diminished from 514 to 140. This is attributed mainly to the introduction of vaccination with glucoside culture in place of the various modifications of Pasteur's method previously employed. Losses from blackleg have similarly diminished since the introduction in 1925 of large-scale preventive inoculation.

During the years 1927 and 1928, an epidemic of fascioliasis in sheep occurred with losses estimated at 20,000 head. Glanders has not appeared since 1929, when two cases were reported. The number of recorded cases of swine erysipelas has recently increased, due probably, according to W., to the introduction from the western districts of Czechoslovakia of animals which are more susceptible. Preventive inoculation is not used owing it is said to the danger of transmitting swine fever with immune serum.

S.F. appears to be a very serious disease in the Carpathians, the number of cases reported annually since 1921 varying from 150 to 7,498. Owing to the conditions under which dogs are allowed to wander, outbreaks of rabies are not uncommon ; during 1936 there were 50 recorded cases in dogs, and ten in cattle.

The inhabitants pay little attention to diseases of the small domestic animals and birds, and accurate data relating to them are not available. Fowl cholera is wide-spread.

In general, infectious diseases on the free range (Weideseuche) are of greatest importance, whereas conditions such as tuberculosis, contagious abortion and metabolic disorders are as yet relatively rare. It is suggested that the introduction of intensive methods of agriculture may well ultimately bring about the state of affairs now existing in the western areas of Czechoslovakia.—E. G. WHITE.

GAMBLES, R. M. (1938). *Disease of Cattle, with Special Reference to Cyprus*.—*Cyprus (agric.) J.* 33. 48-48.

This article consists of a few short notes on the cause, symptoms, treatment, etc., of the commoner cattle diseases, from certain of the more important of which Cyprus is free. The comparatively small number of cattle in the Colony are said to be free from tuberculosis, John's disease, haemorrhagic septicaemia, contagious abortion, rinderpest, foot and mouth disease and contagious bovine pleuropneumonia ; blackleg is becoming rare, and anthrax is mainly confined to goats.

—F. J. ANDREWS.

TABUSSO, M. E. (1937). *Apuntes de epizootología Peruana*. [**Animal Diseases of Peru**]. pp. 26. Lima: Instituto de Altos Estudios Agrícolas del Perú. [8vo]. [Also appeared in *Rev. zootec.* 25. 26-39].

This booklet was published by the Institute of Microbiology, Sera and Vaccines, Lima. It divides Peru into coastal and mountainous regions. The common diseases of the coast are streptococcal mastitis, strangles, anthrax, tuberculosis, haemorrhagic septicaemia, brucellosis, anaerobic infections, piroplasmoses, foot and mouth disease, equine encephalomyelitis, swine fever and helminthiasis. In the mountain region the following diseases are encountered in addition to the first seven enumerated above:—caseous lymphadenitis, braxy, parasitic dermatitis, and enzootic paraplegia of lambs (renguera).

To combat the wide-spread anthrax of the coast, the institute employs "protein vaccines" and saponin vaccines. Arsenical dips are used to control tick infestation. BCG vaccination, if not completely effective, is in the opinion of the institute worth a greatly extended trial.

The infections of the mountain area are neither so serious nor so wide-spread as those of the coast. Blackleg occurs sporadically. Malignant oedema is now dealt with by the use of natural and artificial aggressins. Equine encephalomyelitis appeared in virulent form in 1931, since when its intensity and mortality rate have greatly diminished.

Helminthiasis is the greatest practical problem confronting veterinarians in Peru.

Enzootic paraplegia of lambs (renguera) was investigated by a commission (1938); the cause, however, is still unknown.

The establishment of a quarantine station is recommended.—J. A. PASFIELD.

KOWNATZKI, D. A. (1938). Beitrag zur Bekämpfung der Weissen und Roten Kükenruhr. [**Control of *Salmonella pullorum* Infection and Coccidiosis**].—*Tierärztl. Rdsch.* 44. 89-91, and 108-110. [Numerous refs.]

K. states that a dead *pullorum* vaccine (prepared by the Bacteriological and Serological Institute at Landesberg), is of value in the control of pullorum disease. It is harmless to hens and chicks and is said to give good results on properly managed poultry farms.

Normal horse serum is said to be useful in the treatment of chicks for coccidiosis (dose 1 c.c.)—SASSENHOFF (MUNICH).

- I. BEVERIDGE, W. I. B. (1938). **Foot-Rot in Sheep: A Preliminary Note on the Probable Causal Agent**.—*J. Coun. sci. industr. Res. Aust.* 11. 1-3.
- II. BEVERIDGE, W. I. B. (1938). **Investigations on the Viability of the Contagium of Foot-Rot in Sheep**.—*Ibid.* 4-13. 2 tables.
- III. BEVERIDGE, W. I. B. (1938). **The Control of Foot-Rot in Sheep**.—*Ibid.* 14-20. [3 refs.]

I. Having thoroughly investigated the possibility that foot-rot of sheep might be due to *Fusiformis necrophorus*, to the spirochaete *Sp. penortha*, or to a fusiform organism commonly present in the lesion, B. concluded that none of these organisms was primarily responsible. He subsequently isolated a Gram-negative, anaerobic, serophilic organism, which he designated "K", and by applying pure cultures of it to the scarified feet of sheep he was able to induce typical foot-rot lesions with regularity. He believes that *F.n.*, *Sp.p.*, and the fusiform organism referred to above may play a part in the accentuation or continuation of lesions induced by "K".

II. This deals with the survival of the contagium of ovine foot-rot (a) apart from the sheep, and (b) in association with the sheep's foot. Under the most favourable conditions that could be devised, material from foot-rot lesions only remained infective for a few days when removed from the animal's foot. On the other hand, the infection will persist for years in an affected foot and can survive in pockets under the horn of apparently cured feet for many months. In addition, a superficial dermatitis of the interdigital space occasionally persists for some months in affected sheep, although the actual foot-rot lesions have been cured. The infective agent survives in these mild skin lesions unless they are subjected to treatment.

III. Methods of control, with the object of eliminating foot-rot, are here discussed. Since foot-rot is due to a specific infection which does not appear capable of surviving more than a very short period away from the sheep's foot, it should be possible to eradicate it. The whole matter is fully discussed in the light of laboratory and field experience. Results already obtained in Australia by the application of this knowledge to the control and eradication of the disease in the field are briefly mentioned. Field trials are still under way.

These are important contributions and should be read in full by all who are interested in this disease. B's work bids fair to place foot-rot among those diseases which can be eradicated with relative ease.—D. A. GILL.

BEHRENS, H. (1937). Untersuchungen über seuchenhaftes Verlammen in Schleswig-Holstein. [**Abortion of Sheep in Schleswig-Holstein**].—*Inaug. Diss., Hanover*. pp. 29. [Numerous refs.]

Sheep abortion is common in Schleswig-Holstein. B. could find no species of bacteria in aborted foetuses to which the condition might be attributed. He made estimations of the albumin:globulin ratio on 68 blood samples from five different sheep farms, on which abortion was prevalent, as part of an enquiry to ascertain whether dietetic error might be involved; it was abnormal in 44, and "doubtful" in four. There was degeneration of the heart muscle of aborted foetuses.

The author believed that the condition was due to defective nutrition of the sheep during gestation; in central and east Holstein the available fodder is poor in quality and lacking in vitamins, and on the west coast the ewes during the last few weeks of pregnancy are allowed to graze in cabbage fields.

MOSTARDA, G. (1937). Su di una enzootia di mastite gangrenosa della pecora. [**Enzootic Gangrenous Mastitis in Sheep**].—*Clin. vet., Milano*. 60. 37-41. A clinical account of an outbreak.—S. F. J. HODGMAN.

BRINTRUP, A. (1937). Ueber Gelenkentzündungen bei ausgewachsenen Schweinen. [**Arthritis in Adult Pigs**].—*Inaug. Diss., Hanover*. pp. 88. 4 figs. [11 refs.]

Of 4,892 pigs examined clinically and after slaughter at the Münster abattoir, 70 were found to be affected with arthritis. The joints of the hind legs were more frequently involved than those of the fore-legs.

*Erysipelothrix rhusiopathiae* was recovered from seven cases, and tubercle bacilli from one case. In one animal, trauma was considered to be the cause, and in two others the arthritis was associated with osteodystrophia fibrosa. The remaining cases yielded various organisms on culture—mainly staphylococci and streptococci—except for four from which no bacteria could be isolated. In the affected joints there was an increase in synovial fluid, which was usually blood-tinged, and the local lymph nodes were enlarged.—E. G. WHITE.

BAUMANN, R. (1938). Zur pathologischen Anatomie der ansteckenden Lungenbrustfellentzündung der Angoraziegen. [**Pathology of Infectious Pleuropneumonia in Angora Goats**].—*Arch. wiss. prakt. Tierheilk.* 73. 285-294. 9 figs. [Numerous refs.]

This disease was first described in Algiers in 1873 and has since been recorded in Germany, Italy and in various parts of Africa and Asia Minor. In 1920 it was introduced into Greece from Asia Minor and eventually reached Bulgaria. It occurred in Germany, but has not been recorded there since 1918. A detailed description of the pathological anatomy is given from B's experience of an outbreak in Anatolia (Asia Minor) during 1936-1937.

The disease occurs only in mountainous country and appears to be favoured by large variations between day and night temperatures. The cause is considered to be a filtrable virus.

The lesions begin as peribronchial pneumonic foci, which, when superficial, are covered by a local fibrinous pleuritis. There is usually a serous pleural effusion. Necrosis and softening of the pneumonic areas commonly follows, distension of the interlobular septa with fibrinous exudate and an appearance similar to that seen in contagious bovine pleuro-pneumonia, but sequestra are not formed. There is frequently a diphtheritic rhinitis. Histologically, foci of perivascular and peribronchial organization as in contagious bovine pleuro-pneumonia are commonly found. In advanced cases, a variety of bacteria can be isolated, especially *Pasteurella*, and it is said that in Turkey the disease is incorrectly diagnosed as *Pasteurellosis*. [The disease closely resembles that seen in Palestine—see *V. B.* 7. 603].

—E. G. WHITE.

DIFTER, R. (1938). Ueber kongenitale Lungenveränderungen. I. Mitteilung. Kongenitale Bronchiektasie beim Kalbe. II. Mitteilung. Kongenitales Lungenödem beim Ziegenlamm. III. Mitteilung. Multiple Hämangiome in der Lunge eines Rehes. [**On Congenital Lung Changes. I. Congenital Bronchiectasis in a Calf. II. Congenital Pulmonary Oedema in a Kid. III. Hemangiomatosis of the Lung in a Roe Buck**].—*Arch. wiss. prakt. Tierheilk.* 73. 218-231. 3 figs. [Numerous refs.]

I. A depressed area approximately 7 cm. in diameter was found on the pleural surface of the main lobe of the left lung in an otherwise normal calf. The underlying tissue consisted of a mass of cysts and ramifying ducts which had the histological structure of bronchioles. No alveoli were present in this area. This is believed to be the first authentic record of congenital bronchiectasis in animals.

II. In a stillborn kid the lungs were found to be several times the normal size, completely filling the thorax. There were 250 c.c. of a clear pleural effusion. Histologically, the bronchioles and interstitial tissue spaces were filled with fluid. The respiratory tree consisted only of bronchioles and alveolar ducts, no alveoli having been formed, probably due to the obstruction to their outgrowth from the alveolar ducts by the pressure of the fluid.

III. The lungs of a deer were studded with bluish-black nodules 2-5 mm. in size. Histologically, they were found to be multiple cavernous haemangiomata. This is the first record of this condition in deer.

In each of the above cases a review of the literature is given.—E. G. WHITE.

KRAUTER, A. W. (1938). Glomerulonephritis bei Hund und Katze. [**Glomerulonephritis in the Dog and Cat**].—*Arch. wiss. prakt. Tierheilk.* 73. 205-217. 7 figs. [Numerous refs.]

Glomerulonephritis has usually been considered a rare condition in the dog

and cat. K. has, however, described 20 cases in each of these species encountered in the course of a year at the Institute of Veterinary Pathology at Munich.

In the dog, a diagnosis of glomerulonephritis on macroscopic examination of the kidneys is difficult, and histological examination is necessary. Acute, subacute and chronic forms are met with; and the condition appears to be independent of both breed and sex, and is more common in old animals. In the cat, the condition is usually associated with infectious laryngitis and enteritis, and no example of the chronic type was found.

Histologically, the changes resembled those found in glomerulonephritis in man, *viz.*, increase in glomerular tuft nuclei, formation of an exudate within the capsular space, and proliferation of the capsule epithelium, followed in chronic cases by marked fibrosis and hyalinization. In contrast to the condition in man, neutrophile infiltration during the acute stage was very scanty. Secondary degenerative changes in the tubule epithelium were common and were accompanied in chronic cases by interstitial fibrosis and lymphocytic infiltration.—E. G. WHITE.

STUBBS, E. L., & MURPHY, J. M. (1938). **Studies of Recurrent Ophthalmia of Horses.**—*Vet. Ext. Quart. Univ. Pa.* 38. No. 71. 5-18. 4 tables.

"Eye material" from a case of recurrent ophthalmia was preserved by desiccation and by refrigeration for a period of three and a half months, when it was inoculated into the vitreous humour of 17 horses. Ten of these developed a condition that could not be differentiated from the naturally-occurring disease.

Two natural cases were studied over a period of several months, and attempts were made to transmit the condition, 19 horses being inoculated with filtered eye material. Three developed the disease. Attempts were also made to transmit the disease from a supposedly resistant horse to 14 others by the intra-ocular inoculation of blood serum. One developed a reaction similar to that of the natural disease.

The results are confused by the fact that the experimental horses were all old, and had various defects.—A. WILSON TAYLOR.

PARNES, J. (1938). Ein Beitrag zur Frage der Keratitis infektiösa bei Rindern. [**Infectious Keratitis in Cattle.**]—*Tierärztl. Rdsch.* 44. 388.

An infectious keratitis of cattle similar to periodic ophthalmia in horses is described, characterized by an acute catarrhal inflammation of the eyes and conjunctivae, and sometimes leading to damage of the internal structures of the eye. It usually spreads rapidly throughout the herd. Curative treatment is discussed.

—P. S. WATTS.

IMAI, Y., & MORIWAKI, D. (1936). **A Probable Case of Cytoplasmic Inheritance in Man: A Critique of Leber's Disease.**—*J. Genet.* 33. 168-167. [10 refs.]

A short review of the literature on Leber's disease (hereditary optic nerve atrophy) in man. The authors conclude that it is passed on by the female, according to Lossen's law. [It is possible that this condition occurs in calves, apart from that type of blindness which is due to avitaminosis-A; see *V. B.* 8. 724].—J. E.

## NUTRITION IN RELATION TO DISEASE

THEILER, A., DU TOIT, P. J., & MALAN, A. I. (1937). **Studies in Mineral Metabolism XXXVIII. Calcium and Phosphorus in the Nutrition of Growing Pigs.**—*Onderstepoort J. vet. Sci.* 9. 127-164. 11 figs., 16 tables. [7 refs.] [See also *V. B.* 9. 267].

The effect on young growing pigs of P or Ca deficiency or both was studied. Observations were made on body weight, food consumption, blood analysis and the physical, chemical and histological examination of the bones.

It was found that 0.8 g. P daily and 0.1% P in the ration were not only insufficient for normal growth and development, but were also the cause of marked lesions of rickets in the bones. Vitamin D was present in abundance. The usual low inorganic P content of the blood was observed while the serum phosphatase was considerably higher than that of normal pigs. Clinical symptoms of P deficiency appeared shortly after the beginning of the experiment and became extremely pronounced towards its conclusion approximately six months afterwards.

One gramme of Ca daily and 0.1% Ca in the ration were found to be insufficient for normal growth. The presence or absence of light appeared to be without effect and the ration probably contained enough vitamin D. Rickets did not develop at any stage of the experiment as judged from the microscopical examination of rib sections removed under anaesthesia. Bone atrophy or osteoporosis was present and also in one case incipient osteodystrophia fibrosa. The belief is expressed that Ca deficiency alone, will not produce rickets in pigs but might produce osteodystrophia fibrosa, and further work is being done along these lines.

When the ratio of Ca to P was normal and both minerals were present in deficient amounts, the detrimental effect of the deficiencies was by no means as severe as when one was present in insufficient and the other in excessive amounts—*i.e.*, in a wide ratio.

The effects of the deficiencies were more severe in the absence than in the presence of light. Microscopically the rib sections of the pigs showed marked bone atrophy and in two cases incipient rickets. The suggestion is made that the deficiency of P and Ca was not acute enough or that the experiment was not conducted for a sufficiently long period to produce rickets or osteodystrophia fibrosa or both.

Rations containing sufficient Ca and P, *e.g.* 6 g. Ca and 8.2 g. P or 18 g. Ca and 3 g. P with abnormal ratio of Ca to P, produced no effect as compared with the normal group of pigs.

Ratios whose "Erdalkali-alkalinität" ranged from 6.5 mg. equivalents to 62 mg. equivalents were fed for 120 days to eleven-week-old pigs. Sufficient Ca and P were present for normal growth. The pigs grew normally, remained healthy and neither rickets nor osteodystrophia fibrosa developed as might be anticipated from Marek's work. It is suggested that in presence of vitamin D the "Erdalkali-alkalinität" of a ration when sufficient Ca and P are present does not provide an adequate basis for explaining the development of osteodystrophic diseases in pigs.

GROENEWALD, J. W. (1937). **Osteofibrosis in Equines.**—*Onderstepoort J. vet. Sci.* 9. 601-620. 24 figs., 4 tables, 3 appendixes. [11 refs.]

Clinical symptoms of osteofibrosis were noted, and later the existence of the condition was proved by histological bone examination, in 8 two-year-old fillies on a ration which daily contained 4.5 g. CaO and 54.29 g. P<sub>2</sub>O<sub>5</sub> in the case of two, and 28.42 g. P<sub>2</sub>O<sub>5</sub> in the case of the third. G. is of the opinion that considerable confusion exists regarding the nomenclature of this disease, with the result that it is frequently described as osteomalacia. From the data available, it would appear that blood Ca determinations are of little value for diagnostic purposes in cases of suspected osteofibrosis. Facial enlargements, when once established by the disease, were not reduced in size by feeding a ration which was supplemented with CaCO<sub>3</sub>.

WAGMAN, I. H., & GULLBERG, J. E. (1988). **Effect of Vitamin A Deficiency upon Rate of Pupil Dilation during Dark Adaptation.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 618-615. [6 refs.]

Nine rabbits from six to eight weeks of age were put on a vitamin A-free diet for 92 days, during which time weight records and dark adaptation tests for each animal were obtained. A series of photographic measurements were taken to determine the pupil dilatation during dark adaptation on each animal before it was placed on the restricted diet; subsequent measurements were taken every week. An analysis of all the data, from the pre-deficient series to the clear-cut terminal stages when physical lesions of vitamin A-deficiency were observed, showed that there was no significant difference in the rate of response at any point in the series. All the curves of the rate of pupil change during light and dark adaptation showed the form characteristic of normal animals.—R. ALLCROFT.

HECHT, S., & MANDELBAUM, J. (1988). **Rod-Cone Dark Adaptation and Vitamin A.**—*Science*. **88**. 219-221. 2 figs. [8 refs.]

In a study of the relative importance of the rods and cones of the retina in colour vision and an investigation of the influence of vitamin A-deficiency on both rods and cones, the authors studied the dark adaptation function of four normal young men, who were first put on an adequate diet and then on one deficient in vitamin A. Using the adaptometer of HECHT and SCHLAER [(1988). *J. opt. Soc. Amer.* **28**. 269.], it was found that the latter diet resulted in defective colour vision affecting rods and cones equally.—J. E.

WOOLLEY, D. W., STRONG, F. M., MADDEN, R. J., & ELVEHJEM, C. A. (1988). **Anti-Black Tongue Activity of Various Pyridine Derivatives.**—*J. biol. Chem.* **124**. 715-728. 1 fig., 1 table. [19 refs.]

A number of pyridine derivatives were tested for their effectiveness in the treatment of dogs affected with blacktongue. The results indicate that a highly specific molecular structure is required for anti-blacktongue potency. Considerable information was also obtained regarding the ability of the animal organism to carry out certain chemical transformations. A table is given summarizing the biological assays of the various compounds tested.—R. ALLCROFT.

FRASER, A. H. H., GODDEN, W., SNOOK, L. C., & THOMSON, W. (1988). **The Influence of Diet upon Ketonaemia in Pregnant Ewes.**—*J. Physiol.* **94**. 346-357. 4 figs., 3 tables. [Numerous refs.]

With 90 mated ewes divided into six groups of 15, kept in confinement, an attempt was made to produce ketonaemia experimentally, by over-feeding and by protein deficiency. The results did not confirm some commonly held views, such as that pregnancy disease is caused by over-fatness, lack of exercise, or protein deficiency.

The caloric value of the diet was found to be inversely correlated with frequency of occurrence and severity of ketonaemia, and the ketonaemia produced by under-nutrition was more frequent and severe in multiple than in single pregnancies. Some of the symptoms and pathological changes generally considered as characteristic of pregnancy disease were observed in undernourished or fasted pregnant ewes.—R. ALLCROFT.

GIROUD, P., & GIROUD, A. (1988). **Régimes insuffisamment vitaminés et microbes de sortie; morbidité et mortalité en fonction du régime.** [**Vitamin-Deficient Diets and "Microbes de Sortie"; Morbidity and Mortality as a**

**Function of the Diet].**—*C. R. Soc. Biol. Paris.* 128. 606-608. [4 refs.] [See also *V. B.* 8. 594].

During a period of four years, observations were made on over 1,000 guinea pigs divided into two groups: one group received a diet deficient in vitamin C and consisting essentially of cereals, dry hay and beetroots; the other group received the same diet supplemented with green cabbage leaves, which supplied an adequate intake of vitamin C. After infection with "microbes de sortie" of NICOLLE (saprophytic organisms which become pathogenic when the host's natural resistance is overcome), and after submission to the same spontaneous infections, the vitamin C-deficient group had a much greater mortality. From these observations it is concluded that when a certain degree of vitamin C-deficiency exists, the resistance of the body is lowered so that it is much more susceptible to bacterial infection.

—R. ALLCROFT.

WEITZENBERG, R. (1938). Experimenteller Beitrag zur Bedeutung und über das Verhalten des Vitamin C bei bakteriellen Infektionen. [**Significance and Behaviour of Vitamin C in Bacterial Infections**].—*Arch. wiss. prakt. Tierheilk.* 73. 188-204. 5 figs., 3 tables. [Numerous refs.]

In the course of an experiment that was continued for 70 days, W. claims to have shown that g. pigs fed a diet rich in vitamin C were considerably more resistant to artificially administered bacterial infection than were controls fed a diet poor in this respect. Resistance in this case was measured by infecting all animals with *Pasteurella lepticola* and then noting the duration of life of the animals in the vitamin-rich and vitamin-poor groups. As a control of the efficiency of the actual vitamin feeding, the tissues of all animals were tested P.M. for vitamin content.

In a subsequent section of the investigation it was shown that the administration of suprarenal gland extract alone or in conjunction with vitamin C had no influence upon the course of infection, nor did it have any significant influence upon the degree of storage of vitamin in the tissues.—E. J. PULLINGER.

## PUBLIC HEALTH

EHRLICH, C. (1938). Tierarzt und Milchwirtschaft. [**The Veterinarian and Milk Control in Germany**].—*Dtsch. Tierärztebl.* 5. 2-6.

Existing legislation in Germany has not provided for adequate veterinary control over the milk supply, except in the case of certain special grades of milk, and much untreated, infected raw milk, is sold to the consumer. Over large areas there is as yet no pasteurization. E. emphasizes the need for a system of strict and universal veterinary supervision of milk-production, the final aim being to prevent the entry into the market of any raw milk that does not come from herds entirely free from contagious abortion and tuberculosis.

The opposition to veterinary supervision from milk-producers who regard it as a nuisance and as a financial burden should be met by fixing statutory hygienic requirements with which the producer can easily comply, and by making the State responsible for the cost of supervision.—D. H. WILLSON.

CAPODAGLIO, A. (1937). I tempi d'azione della corrente elettrica nella mattazione dei suini e le conseguenti alterazioni da riflessi vascolari. [**The Mechanism of Electrical Stunning of Pigs**].—*Clin. vet., Milano.* 60. 639-641. 1 table. [2 refs.]

Tong electrodes using a current of 70 volts and 0.5 ampères were used for

stunning pigs. Ecchymoses of varying size were found on the pleura and lungs of the pigs, principally on the lower left parts. By varying the duration of application of the electric current to pigs of 14-18 months and 130-140 kg. which had been starved for 16 hours, it was proved that with an average stunning time of about 20 seconds the development of the ecchymoses is minimized. Age, breed and an individual sensibility to the current are of importance.

—HANS GRAF (ZÜRICH).

## THERAPEUTICS

JENSEN, Elsa. (1988). **Comparative Bacteriological Assay of some Phenyl-mercuric Compounds, including Merfen.**—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 247-258. 4 tables. [2 refs.] [In English].

There is not a particularly great difference in the growth-inhibiting power and the germicidal action in 24 hours of the various phenyl mercuric compounds tested; there is, in particular, close agreement between the action of phenyl mercuric acetate, phenyl mercuric acetate plus borax, and merfen alone. With the exception of thiosulphates, all the phenyl mercuric compounds tested were able to sterilize the back of the hand in 1½ minutes in 2% glycerin solutions.

—J. M. ROBSON.

BOHLMAN, H. (1987). **Gas Gangrene Treated with Sulfanilamide. Report of Three Cases.**—*J. Amer. med. Ass.* 109. 254-256. [18 refs.]

Three cases of gas gangrene were treated with sulphanilamide, and there was marked clinical improvement within 24 hours. The results in all three cases were very satisfactory. Sulphanilamide probably had a specific effect on the causal bacilli, but the result may in part have been due to checking symbiotic growth with the streptococcus.—J. M. ROBSON.

- I. HOARE, E. D. (1988). **Bactericidal Changes Induced in Human Blood and Serum by Sulphamido-Chrysoidine and Sulphanilamide.**—*Lancet.* 234. 655-659. 18 tables. [14 refs.]
- II. WHITBY, L. E. H. (1988). **Chemotherapy of Pneumococcal and Other Infections, with 2-(p-Aminobenzenesulphonamido) Pyridine.**—*Ibid.* 1210-1212. 4 tables. [Numerous refs.]
- III. FLEMING, A. (1988). **The Antibacterial Action in vitro of 2-(p-Aminobenzenesulphonamido) Pyridine on Pneumococci and Streptococci.**—*Ibid.* 235. 74-78. 3 figs., 6 tables. [3 refs.]
- IV. SPRAY, R. S. (1988). **Bacteriostatic Action of Prontosil Soluble, Sulfanilamide, and Disulfanilamide on the Sporulating Anaerobes Commonly Causally Associated with Gaseous Gangrene.**—*J. Lab. clin. Med.* 23. 609-614. 8 tables. [2 refs.]
- V. CHINN, B. D. (1988). **In vitro and in vivo Effect of Sulfanilamide on *Brucella abortus* and *Brucella suis*.**—*Proc. Soc. exp. Biol., N.Y.* 88. 782-784.

I. A considerable bactericidal power against haemolytic streptococci was demonstrated in the blood of 12 patients treated with these drugs. No such bactericidal power was present in the blood of normal, untreated controls. In some cases bactericidal activity was present one hour after the first dose of sulphanilamide. Experiments are recorded which show that it is the serum containing free sulphanilamide which is primarily responsible for the killing power developed in the blood of patients receiving sulpha.

II. The drug is chemotherapeutically active in experimental infections in mice against pneumococci of Types I, II, III, V, VII, and VIII, and especially so against Types I, VII and VIII. It appears to exert a definite action on the capsule of the pneumococcus. It is as active as sulphanilamide against the haemolytic streptococcus and meningococcus. It has a low toxicity for animals and does not produce porphyrinuria in those tested.

III. In concentrations which can probably be obtained therapeutically the drug retards the growth of streptococci in human blood; in these concentrations it has a limited bactericidal effect. Blood containing the drug in such concentrations can, however, destroy a considerable number of streptococci, leucocytes being necessary for this destruction. If blood is rendered "immune" by the addition of some specific immune serum, the apparent effect of the chemical is enhanced. It is suggested that to obtain the best results with the drug, patients should be immunized actively or passively.

IV. These drugs exert an apparently specific selective action against *Cl. tetani*, "*Cl. lentoputrescens*", *Cl. novyi*, *Cl. septicum* and *Cl. histolyticum*. Little or no effect is exerted on *Cl. welchii*, *Cl. sporogenes*, *Cl. bifermentans* and *Cl. botulinum* in concentrations similar to those used therapeutically. The bacteriostatic activity increases in the order:—prontosil soluble, sulphanilamide, and disulphanilamide. The results of BOHLMAN [p. 399.] in the treatment of three cases of *Cl.w.* infection in man can only be explained on the assumption that the drug produces some secondary therapeutic action.

V. The drug produces a bactericidal and bacteriostatic effect on these organisms *in vitro*. Dilutions of 1:10,000 destroy most of the organisms within ten minutes. Dilutions of  $10^{-6}$  produce a definite bacteriostatic effect. Similar effects have also been obtained with *Brucella melitensis*. G. pigs inoculated intra-abdominally with *Br. abortus* or *Br. suis* received 100 mg. of the drug *per os* daily, and this prevented development of a generalized infection.—J. M. ROBSON.

- I. FINDLAY, G. M., & MACCALLUM, F. O. (1938). **Chemotherapy of Virus Diseases.** [Correspondence].—*Brit. med. j.* April 16th. 875.
- II. OAKLEY, C. L. (1938). **Chemotherapy of Virus Infections.**—*Ibid.* April 23rd. 895-896. [2 refs.]
- III. RHODES, A. J., & VAN ROOYEN, C. E. (1938). **Chemotherapy of Virus Diseases.** [Correspondence].—*Ibid.* 924.
  - I. The authors report negative results in the treatment with red prontosil of lymphocytic choriomeningitis, yellow fever and Rift Valley fever in monkeys and mice.
  - II. Five drugs of the sulphanilamide group were tested for curative properties on a total of about 400 mice infected with influenza virus. The results were all negative.
  - III. The authors found prontosil to be useless in the chemotherapy of poliomyelitis in monkeys and in rabbit myxomatosis.—J. M. ROBSON.

MOULIS. (1938). Essai de traitement des trypanosomiasis animales par le sérum de cynocéphale. [The Treatment of Animal Trypanosomiasis with Monkey Serum].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 3. 13-14.

A horse which showed no improvement when treated with novarsenobenzol, and a cow which had been treated with tartar emetic, but which later relapsed, were given an intravenous injection of 8-10 c.c. of serum from a healthy *Cynocephalus*. Both animals made an apparent recovery from trypanosomiasis. [The species of trypanosome concerned in the infections is not stated].—U. F. R.

ANON. (1938). Protection des plaies contre les mouches. [**Protection of Wounds from Flies**].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 2. 65-66.

The two following prescriptions were found useful as fly repellents :—(a) 10 parts powdered naphthaline or quinine chloride, 20 parts alum and 100 parts plaster of Paris, and (b) 30 g. vaseline, 30 g. lanoline, 5 g. oil of juniper, 1.5 g. nitrobenzene, and 6 drops of formol.

STAMATIN, L. (1937). Le traitement de la gale par l'hyposulfite de sodium et l'acide chlorhydrique. [**Treatment of Mange by Sodium Hyposulphite and Hydrochloric Acid**].—*Archiva vet.* 29. No. 6. 12-15. [In French].

S. records the successful treatment of dogs, sheep, pigs and rabbits affected with acariasis. [The identity of the parasite responsible is not mentioned in connexion with any of the cases described]. After removal of the hair or wool, the affected areas were washed with warm water, and 60% sodium hyposulphite solution applied with a brush. When the areas had dried, a 10% solution of hydrochloric acid was applied in the same manner. In all cases the lesions healed in a day or two, and the animals remained healthy during the subsequent period of observation, which was usually two months.—J. MACLEOD.

MARTINI, I. (1937). Attualità terapeutiche in medicina veterinaria; l'olio di chaulmoogra nella cura della rogna demodectica. [**Treatment of Demodectic Mange with Chaulmoogra Oil**].—*Clin. vet., Milano.* 60. 715-718.

A bulldog and a fox terrier affected with extensive pustulous and desquamative demodectic mange were rubbed daily with a mixture of 10 parts chaulmoogra oil, 20 parts ether, and 15 parts each of 95% alcohol and of ether petrolatum. Regeneration of the skin and healing took place after some weeks.—HANS GRAF (ZÜRICH).

MONTGOMERIE, R. F. (1937). **Drugs of Value in the Treatment and Control of Liver-Rot of Sheep**.—*J. comp. Path.* 50. 314-316.

Little specific treatment was attempted until the winter of 1920-1921; then, and in succeeding years, "danistol", a proprietary extract of male fern, proved of value in the expulsion of mature flukes.

An investigation, commenced by M. in 1924, showed that liquid extract of male fern, although as effective as "danistol" in the expulsion of adult flukes, was equally ineffective in dealing with immature forms in the small bile ducts and the parenchyma of the liver. In the winter of 1925-1926, he found that carbon tetrachloride in doses as low as 0.5 c.c. destroyed all mature flukes, and that an increase in the dose increased the efficiency of the drug in the expulsion of the immature forms. Maturity of the flukes, as shown by the presence of fluke eggs in the faeces, took place 11 weeks after the feeding of cercariae. The drug in doses of 10 c.c. caused the expulsion of flukes as young as four weeks; similarly, 5 c.c. of carbon tetrachloride caused the expulsion of flukes seven weeks old, and 3 c.c. the expulsion of eight-week-old flukes.

Tolerance of the drug varied: a dose of 1 c.c. was, generally speaking, non-toxic; mountain sheep have been shown to tolerate as much as 50 c.c. without any ill effect. On the other hand, for reasons as yet unexplained, certain flocks, generally of in-lamb ewes in good condition, folded and/or hand-fed, have been shown to be intolerant of the drug in doses as low as 1 c.c.—L. E. HUGHES.

LEVINE, P. P. (1938). **Studies on the Control of the Poultry Cestode *Davainea Proglottina* (Dav.)**.—*Cornell Vet.* 28. 220-227. 1 table. [17 refs.]

Anthelmintic studies under controlled conditions were undertaken upon

chickens experimentally infested with *D.p.* The following drugs were administered :—kamala, "oleoresin aspidii", rotenone, hexylresorcinol, santonin, a mixture of turpentine and liquid paraffin, pelletierine tannate, betanaphthol, carbon tetrachloride, tetrachlorethylene, arecoline hydrobromide, oil of chenopodium in liquid paraffin, areca nut and kamala, thymol, "Jen-Sal worm powder", "iodine vermicide" (Merck), thymol nicotine tablets, kamala nicotine tablets, "rota caps", and areca nut alone. In no instance was the treatment successful. Areca nut was the only drug which removed any scolices, but only two birds were tested. Additional experiments proved that neither 2% tobacco dust in the mash nor 1 : 500 copper sulphate in the drinking water prevented infestation of chickens.

Infested slugs survived a severe winter in the field and also eight days' experimental exposure at 3°-5°C. Exposure for 24 hours at -1°C., however, was lethal to slugs and cysticeroids.—D. D. OGILVIE.

ANON. (1988). **Sulfanilamide as a Treatment for Salmon Poisoning in Dogs.**—*N. Amer. Vet.* **19**. No. 9. 57-59. 1 table, 1 chart. [2 refs.]

Out of 48 cases of "salmon poisoning" in dogs, treated by sulfanilamide, 38 recovered. In over 90% of untreated cases the disease was fatal. The drug was administered orally, 7-12 days after ingestion of the parasitized fish, 1-3 grains per lb. body weight being given every 24 hours. Improvement was usually noted in 24-48 hours, but administration was continued for a number of days. No detrimental after-effects were noted. It is suggested that, as sulphanilamide has not yet been shown to have any effect on virus diseases, the causative agent of "salmon poisoning" does not fall within the filtrable virus group.—D. D. OGILVIE.

PACINI, A. J. (1938). **The "Saturation" Method for the Treatment of Breeding Failures with Wheat-Germ Oil.**—*J. Amer. vet. med. Ass.* **93**. 236-238. [8 refs.]

This method consists in feeding an initial dose of 4 oz. of wheat-germ oil to the animal. This is followed by a tablespoonful of wheat-germ oil every third day for 21 days; thereafter the animal is given grain feed to which 4 oz. w.-g. o. has been added to each ton of feed. It is claimed that the method is effective in about 85% of cases of ovarian subfunction, as against 70% treated by parenteral injection. There is a short discussion on the factors present in w.-g.o.; it is emphasized that it contains factors in addition to vitamin E.—N. J. SCORGIE.

LANGDON-BROWN, W. (1988). **Organotherapy.**—*Brit. med. J.* Oct. 15th. 773-776. [19 refs.]

Organotherapy can be used :—(1) as substitution therapy, where there is glandular insufficiency; (2) to provide pharmacological agents, *e.g.*, insulin in schizophrenia; (3) to provide an antagonist to another hormone, *e.g.*, oestrogens to inhibit pituitary activity; (4) to influence general metabolism; (5) as an attempt to utilize antihormonal activity (has not been successful so far), and (6) empirically in a variety of conditions. The substances can be given orally, subcutaneously, intramuscularly, intravenously, nasally, rectally and cutaneously.—J. M. ROBSON.

## POISONS AND POISONING

BRIESE, R. R., & COUCH, J. F. (1988). **Preservation of Cyanogenetic Plants for Chemical Analysis.**—*J. agric. Res.* **57**. 81-107. 2 figs., 23 tables. [Numerous refs.]

Losses of HCN from fresh cyanogenetic plants vary from 13% to 83% in

1-6 days. Large losses may occur when plants are stored in water and chloroform, with and without addition of alcoholic KOH. Rapid loss of HCN occurs in both acid and alkaline solutions; in the latter case the loss may be due to destruction of HCN rather than to inhibition of cyanogenesis. The maximum potential yield of HCN cannot be relied upon to develop after preservation by alcohol.  $\text{HgCl}_2$  in aqueous solution is an excellent preservative, plants being kept in a 1% solution for six months without loss of HCN. A temperature of 25°C. was found to be optimum for preservation. Heating with dilute acids converts large quantities of HCN into other compounds, an unavoidable error in determining HCN.

—ALFRED EDEN.

STEYN, D. G. (1988). **The Presence of Hydrocyanic Acid in Stock Feeds and Other Plants.**—*J.S. Afr. vet. med. Ass.* 9. 60-64. [6 refs.]

Reference is made to several plants which are extensively used as stock feeds and which may, under certain conditions of soil and climate, produce HCN, viz, linseed cakes, sudan grass, kaffir corn and the pods of *Acacia giraffae*. In addition, lucerne and the creeping salt bush are mentioned. Specimens of stunted and wilted lucerne collected during a spell of hot weather were found to produce appreciable amounts of HCN. It was also found in wilted specimens of salt bush, but not in fresh specimens and probably exists in the plant as a cyanogenetic glucoside.

*Acalypha indica*, a plant belonging to the Euphorbiaceae was found to contain HCN. The blood of rabbits, which died after being dosed with the plant, was found to be chocolate brown, but methaemoglobin could not be demonstrated. No symptoms were produced when the HCN in the plant was removed.—E. M. R.

MATHEWS, F. P. (1988). **An Experimental Investigation of Lechuguilla Poisoning.**—*Arch. Path.* 25. 661-688. 8 figs., 18 tables. [6 refs.] [Copied verbatim from *Brit. chem. Physiol. Abstr.* July, 1988. p. 609. Signed C. J. C. B.]

Oral administration of alcoholic and aq. extracts of *Agave lechuguilla*, in small doses, the feeding of the ripe fruit of buckwheat (*Fagopyrum esculentum*) and also the alcoholic extract of hulls of buckwheat, rendered guinea-pigs and rats (but not rabbits) sensitive to exposure to sunlight. Buckwheat middlings and the intraperitoneal injection of 0.001 g. of eosin also sensitized rats to sunlight. In each case the signs were erythema, pruritis, lacrymation, oedema of face and ears, exophthalmos, followed by superficial necrosis of the ears, opacity and ulceration of the cornea, and nervous disturbances. The primary change was degeneration of the cutaneous capillary endothelium followed by oedema; leucocytes and plasma cells were abundant in the oedematous areas. The greater part of the activating light for buckwheat and lechuguilla poisoning was absorbed by red, green, and blue filters but not by yellow and appeared to be located in the region of the Na lines. Reactions could not be caused in sensitized animals by exposure to either C or Hg arcs. Recovery was followed in rats and guinea-pigs by a non-sp. resistance (in which only erythema could be produced) which lasted for 10 weeks but could be maintained indefinitely by continual administration of the agent and exposure to light. In addition to the photodynamic agent, a substance was extracted from lechuguilla which gave reactions compatible with those of a saponin or mixture of saponins and was hepatotoxic and nephrotoxic in rats and guinea-pigs; the serious losses of goats and sheep due to lechuguilla are attributed chiefly to the saponin and not to photosensitization.

RIMINGTON, C., QUIN, J. I., & ROETS, G. C. S. (1937). **Studies Upon the Photosensitisation of Animals in South Africa. X. The Icterogenic Factor in Geel-dikkop. Isolation of Active Principles from *Lippia rehmanni* Pears.**—*Onderstepoort J. vet. Sci.* 9. 225-255. 17 figs., 6 tables. [6 refs.] [See also *V. B.* 8. 50].

An improved method is described for the isolation of the icterogenic material from *L.r.* Pears (Verbenaceae). This takes advantage of the slight solubility of the sodium salt of the active material in solutions containing sodium ions. The active principle icterogenin given in a dose of 1.5 g. or more *per os* to a sheep causes bilirubinaemia within 24 hours, together with atony and stasis in the fore stomachs and large intestines. By the intravenous route it was very toxic, quantities of 1 mg. causing death with shock-like symptoms. In doses of 1 mg. icterogenin has a pronounced inhibitory effect on the isolated heart when added to the perfusion fluid. It is haemolytic *in vitro* in a concentration of 1 : 85,000. Examination of the root bark of *L.r.* shows that the highest concentration of icterogenin is present in this tissue. A quantitative experiment extending over a year shows that a translocation of icterogenin takes place from the leaves to the root bark in *Lippia* plants. The effect of growth, season, etc., on this mechanism has been studied in relation to geel-dikkop.—E. M. ROBINSON.

- I. RIMINGTON, C., & ROETS, G. C. S. (1936). **Chemical Studies upon the Vermeerbos, *Geigeria Aspera* Harv. I. Isolation of a Bitter Principle "Geigerin".**—*Onderstepoort J. vet. Sci.* 7. 485-506. 4 figs. [7 refs.]
- II. RIMINGTON, C., ROETS, G. C. S., & STEYN, D. G. (1936). **Chemical Studies upon the Vermeerbos, *Geigeria Aspera* Harv. II. Isolation of the Active Principle, "Vermeerie Acid".**—*Ibid.* 507-520. 6 figs. [3 refs.]

I. There has been isolated from toxic consignments of *G.a.* Harv. a neutral lactonic bitter principle to which the name geigerin has been assigned. This substance, though not the true toxic principle would appear to be not altogether devoid of pharmacological properties. From results obtained in the work dealt with in this communication, it would appear that geigerin is closely related chemically to the active principle of the plant which causes "vermeersiekte". Geigerin is a monolactone, and the corresponding acid, geigeric acid, has been prepared. It would appear from the literature that geigerin is in all probability identical with the substance extracted by THOMS from *Chrysanthemum cinerariaefolium* in 1891, and named by him pyrethrosin.

Preliminary pharmacological experiments upon rabbits, sheep and cats are reported.

II. The toxic principle of the vermeerbos, *G.a.* has been isolated. It is a dibasic acid  $C_{18}H_{28}O_7$ , and has been named vermeeric acid. On standing in the air, vermeeric acid gradually loses two molecules of water, forming the crystalline dilactone vermeerin  $C_{18}H_{24}O_5$ .

Vermeerin has M.P.  $143^{\circ}\text{C}$ . and  $[\alpha]_D^{28} = -50.51^{\circ}\text{C}$ ., but vermeeric acid is optically inactive.

Both substances, like geigerin, give a colour reaction with hydrochloric acid, but the colour is browner, and in the case of vermeerin it is of very slight intensity. An absorption band at  $546.5\text{ m}\mu$  could be distinguished and, two other bands were faintly discernible.

Vermeeric acid forms a 2:4 dinitrophenylhydrazone soluble in sodium carbonate and re-precipitated by acids. This derivative appears to contain less  $H_2O$  than that expected upon the assumption of a simple reaction, and it is thought probable that closure of one lactone ring simultaneously occurs. Vermeerin when

treated with hot Brady's reagent reacts to such a slight extent that the absence of any ketonic or keto-enolic function is inferred in the undecomposed substance.

Vermeeric acid decolorizes potassium permanganate in the cold. By oxidation with this reagent in alkaline solution at the boiling temperature there was obtained an acid crystallizing in small prismatic needles, of M.P. 229-230°C. and another substance which when treated with cold dilute acid immediately liberated acetaldehyde, the 2 : 4 dinitrophenylhydrazone of which was prepared for identification.

Accompanying vermeeric acid in the plant were found two flavone-like substances, the one with M.P. 269-271°C. being, in all probability  $C_{17}H_{12}O_6(CH_3O)_2$ , the other, of M.P. 243-244°C., having the formula  $C_{19}H_{18}O_7$  (methoxyl not determined).

Vermeeric acid drenched to sheep in doses of 10-15 g. caused death from acute "vermeersiekte" within 6-48 hours.

DERZELLE, E. (1938). Intoxication alimentaire du cheval par les vesces. [**Poisoning of Horses by Vetches**].—*Ann. Méd. vét.* **83**. 293-301.

A mare fed exclusively on fresh vetches for a month developed symptoms of haemoglobinuria and icterus. On changing the diet to oats and wilted vetches there was some recovery, although the animal remained weak. Six weeks later there was a recurrence of the condition, with similar symptoms and elevated temperature. Bacteria and piroplasms could not be incriminated as causal agents, but recovery occurred when all vetch feeding was stopped. Various possible causes of the condition are discussed, but it was concluded that the cause was vetch poisoning, and although there was no evidence of any specific constituent as the toxic factor, the tentative suggestion of HCN poisoning is put forward.—A. E.

## PHYSIOLOGY

DE MOULIN, F. (1938). Iets over de huid van den buffel. [**The Skin of the Buffalo**].—*Ned.-ind. Bl. Diergeneesk.* **50**. 238-241.

The epidermis of the buffalo is only slightly thicker than that of cows, but the corium is much thicker. The number of glandulae ceruminosae is greater on the under side of the abdomen than on the back, and the number of blood-vessels there is also much greater. The skin arteries all have very thick walls, with abundant muscle fibre. These blood-vessels are surrounded by loose connective tissue, so that the vessels may expand.—JAC. JANSEN (UTRECHT).

RIDDLE, O., & CAUTHEN, G. E. (1938). **Erythrocyte Number in Young Pigeons and Its Relation to Heredity, Growth and Metabolism**.—*Amer. J. Physiol.* **122**. 480-485. 1 fig., 1 table. [16 refs.]

The authors studied the fluctuations in red blood cell values in pigeons for 100 days after hatching. In the first three days after hatching, the number of red blood cells fell from 1,275,200 to 1,078,000 per c.mm. of blood. At about the 27th day of post-natal life the maximum value of 8,409,700 red blood cells was reached, and this was maintained for about 80 days. This reduction of red blood cells in early post-natal life has also been observed in rats, rabbits and human beings.

The red blood cell level is closely associated with growth capacity in the first three days. Only the early period (about one third) of red blood cell increase is associated with an increased basal metabolic rate. After the end of the third or fourth month the red blood cell level and the basal metabolic rate slowly diminish throughout life.—D. L. HUGHES.

FRASER, F. R. (1938). **The Clinical Aspects of the Transmission of the Effects of Nervous Impulses by Acetylcholine.**—*Brit. med. J.* June 11th. 1249-1254, June 18th. 1298-1299, and June 25th. 1349-1354. 13 figs. [Numerous refs.]

Acetylcholine is believed to transmit the nervous impulse from nerve endings to the effector organs in the following fibres :—

(1) The "muscarine" group ; all post-ganglionic para-sympathetic fibres, post-ganglionic sympathetic fibres to the sweat glands, sympathetic vaso-dilator fibres to the muscles, and antidromic impulses conveyed by sensory fibres to cutaneous vessels.

(2) The "nicotine" group ; all preganglionic fibres of the autonomic nervous system, motor nerves to skeletal muscle and the nerves to the adrenal medulla.

By intravenous injection, acetylcholine produces vasodilatation, sweating and typical parasympathetic effects ; its action is very brief, as it is rapidly hydrolysed by the choline esterase in the blood. By intramuscular or subcutaneous injection its action is more prolonged, but is very uncertain. Atropine inhibits most of the "muscarine" group of effects ; physostigmine potentiates its activity by inhibiting the esterase.

Carbaminoyl-choline and acetyl- $\beta$ -methyl choline are more stable than acetylcholine and have very similar actions ; the first is dispensed in 1 c.c. ampoules containing 0.1 mg. or 0.25 mg. as lentin and doryl respectively ; the second is sold as mecholol. These drugs have a more pronounced and lasting effect on the gastro-intestinal tract and urinary bladder than has acetylcholine, while causing less disturbance to the cardio-vascular system. In man they are used in cases of post-operative gastro-intestinal atony and retention of urine. They have also been used successfully in cases of chronic glaucoma.

Prostigmin is the di-methyl-carbamine ester of 3-oxyphenyl-trimethyl-ammonium methyl sulphate, and has very similar actions to physostigmine except that it causes less disturbance to the cardio-vascular system ; for this reason it is preferred in human medicine to physostigmine in the treatment of gastro-intestinal atony.—A. T. PHILLIPSON.

FOLLEY, S. J. (1938). **The Role of the Anterior Pituitary in Lactation. A Review of Recent Work.**—*Lancet.* 235. 889-890. [Numerous refs.]

When pregnant animals are hypophysectomized, the subsequent lactation does not appear, or is transient ; hypophysectomy also leads to a cessation of lactation actually in progress. Anterior pituitary extracts produce lactation. Prolactin (a purified anterior pituitary extract) produces growth of the crop gland of the pigeon, but not necessarily lactation in the mammal, though a crude anterior pituitary extract can do so. In addition to prolactin, adrenal cortex hormone or anterior pituitary adrenotropic hormone is necessary for lactation in hypophysectomized animals. The ability of anterior pituitary extracts to stimulate the secretion of normal milk is more closely correlated with their glycotropic (anti-insulin) activity than with pigeon crop-stimulating activity.—J. M. ROBSON.

I. CHRISTNACH. (1938). Ueber die neuesten Ergebnisse der Hormonforschung bei trächtigen Stuten und über eine darauf aufgebaute frühe Trachtigkeitsdiagnose auf chemischem Wege. [Recent Research on Hormones of Pregnant Mares and Chemical Pregnancy Diagnosis].—*Z. Veterinärk.* 50. 227-236. [14 refs.]

II. KRAUSS, F. (1988). Die Verwertbarkeit der Kustallowschen Reaktion zum Trächtigkeitsnachweis beim Rinde. [**Kustallow Pregnancy Diagnosis Method in Cattle**].—*Dtsch. tierärztl. Wschr.* **46**. 258-259. 3 tables. [4 refs.]

I. A short discussion is given on the hormones produced by the pituitary, ovaries, testes, etc. Cuboni's method of diagnosing pregnancy [*V. B.* **6**. 379.] was tested on 31 non-pregnant mares and ten pregnant mares to see if it could be applied quickly by a field worker. The method has proved reliable but, in C's opinion, is too complicated to be used in the field.

II. This test [see *V. B.* **9**. 189.] was applied to the urine of 15 pregnant and 10 non-pregnant cows. In all but one case the protozoa ceased to move in 0.5 to 2 minutes. In the one case in which movement persisted longer, the specific gravity was 1014, as opposed to 1030-1040 for the other animals. The urine was diluted to 1003 in all cases and the test reapplied, and in no case did the protozoa lose their activity. Solutions of gonadotropic and ovarian hormones had no effect on the movements of the protozoa. It is concluded that this test is not specific for ovarian hormone excreted in the urine, but that it depends upon the specific gravity of the urine and is consequently useless for the diagnosis of pregnancy in cattle.—A. T. PHILLIPSON.

ASIMOV, G. J., & KROUZE, N. K. (1987). **The Lactogenic Preparations from the Anterior Pituitary and the Increase of Milk Yield in Cows.**—*J. Dairy Sci.* **20**. 289-306. 5 figs., 10 tables. [Numerous refs.]

Experiments carried out on 600 cattle on a state farm in the U.S.S.R. showed that injection of a lactogenic preparation (a total extract of the anterior pituitary) produced a considerable increase in the milk yield for several days. The injections were most effective in well kept cows and during the first half of the lactation period. The quality of the milk remained normal and in some cases the percentage of butterfat was slightly increased. Tests carried out over a period of two or three years showed that the injections were quite harmless and had no undesirable after-effects on the productivity of the animals.—R. ALLCROFT.

BRÜGGEMANN, J., & RATHSFELD, H. (1987). Beitrag zur chemischen Zusammensetzung des Analbeutelsekretes vom Hund. [**Chemical Composition of the Secretion of the Anal Sac in Dogs**].—*Hoppe-Seyl. Z.* **250**. 123-131.

The secretion from the anal glands of dogs was subjected to chemical analysis. It was found that such secretion consisted of about 85% water and 15% dry matter. The latter contained a small percentage of phosphates, but was composed largely of cholesterol and fat. The details of the analyses are recorded.—E. J. PULLINGER.

## TECHNIQUE AND APPARATUS

I. NELSON, W. E., SEIBERT, Florence B., & LONG, E. R. (1987). **Technical Factors Affecting the Tuberculin Test.**—*J. Amer. med. Ass.* **108**. 2179-2181. 3 tables. [7 refs.]

II. ANON. (1987). **Adherence of Tuberculin to Syringes.**—*Brit. med. J.* Oct. 2nd. 670. [3 refs.]

I. The authors report false positive reactions to Schick tests on human beings, in which the error was traced to the fact that the syringe used for the injection had previously contained tuberculin and had not been freed from it by the usual rinsing, boiling and autoclaving procedure. They found by appropriate tests that false positive allergic reactions could occur when any parts of the apparatus

(glassware, etc.), used for holding the injection material, had previously contained old tuberculin or purified protein derivative (P.P.D.). They further found that traces of tuberculin were not removed from syringes either rinsed in 5% NaOH, immersed in 5% NaOH overnight, washed in water, or heated for ten minutes in sulphuric acid plus dichromate cleaning mixture, but that the traces were removed when the syringes were placed for 12 hours in  $\text{H}_2\text{SO}_4$  plus dichromate, washed in water, and boiled in soap solution, or else boiled in soap solution and left for 12 hours in  $\text{H}_2\text{SO}_4$  plus dichromate.

II. A note calling attention to I. [See also PARISH and O'BRIEN, *V. B.* 6. 352].—J. E.

RISHWORTH, H. R. (1938). **Efficiency of Steam Sterilizers.**—*Brit. med. J.* Sept. 10th. 574-576. 2 figs., 2 tables. [5 refs.]

The use of the pressure gauge for inferential readings of temperature in sterilizers is deprecated, since residual air and lag in temperature rise are two fundamental causes of inefficiency in working. The Gravity Discharge System and the direct Internal Thermometer Control System for ensuring maximum efficiency in sterilizers are described, and their relative merits discussed.—R. A.

JENKE, M., & BANDOW, F. (1937). Ueber die Verwertbarkeit der Schwefelsäure-Fluorescenzreaktion der Gallensäuren im Blut, Stuhl und Harn. [Use of the "Sulphuric Acid-Fluorescence" Reaction for Bile Acids in Blood, Faeces and Urine].—*Hoppe-Seyl. Z.* 249. 16-28.

It is concluded on the results of detailed experiments that the sulphuric-acid-fluorescence reaction is not reliable for use as a quantitative test for bile salts in blood, faeces or urine.—E. J. PULLINGER.

I. ZEILE, K., & RAU, B. (1937). Ueber die Verteilung von Porphyrinen zwischen Aether und Salzsäure und ihre Anwendung zur Trennung von Porphyringemischen. [Separation of Porphyrins by Ether and Hydrochloric Acid, and its Use in the Breaking up of Porphyrin Mixtures].—*Hoppe-Seyl. Z.* 250. 197-217.

II. FISCHER, H., & HERRLE, K. (1938). Einwirkung von Licht auf Porphyrine. (I Mitteilung). Ueberführung von Aetio-porphyrin I in bilirubinoide Farbstoffe. [Effect of Light on Porphyrin. Part I. Conversion of Aetio-Porphyrin I into Billrubinoid Pigment].—*Ibid.* 251. 85-96.

I. Porphyrins may be separated into their component fractions, copro-, deuto- and protoporphyrin, by the use of ether and hydrochloric acid. Fractionation is governed by a law which can be expressed by a simple equation containing two given constants. This type of fractionation of porphyrins can be applied to the analysis of pathological faeces and of fossils.

II. A technical article dealing with the various steps in the conversion of aetio-porphyrin I into bilirubinoid pigment. Descriptions of the technique from the quantitative and qualitative points of view are given.—E. J. PULLINGER.

VAN NIEKERK, P. LE R. (1937). **Veterinary Biochemical Studies I. A Rapid Method for the Determination of Copper in Biological Material.**—*Onderstepoort J. vet. Sci.* 9. 628-628. 3 tables. [6 refs.]

The author has modified the methods of MACFARLANE [(1932). *Biochem. J.* 26. 1022.] and TOMPSETT [(1934). *Ibid.* 28. 1544.], in order to overcome the interference caused by the iron present in some biological material, by reducing the amount of carbamate reagent generally used and accelerating the process of

combustion of the material through the introduction of an oxidizing agent (mixture of magnesium nitrate and carbonate). The combustion time is cut down by about one half, and at the same time the copper is rendered more easily soluble for subsequent extraction.—H. GRAF.

SHORTT, H. E., HAWLEY, H., & SWAMINATH, C. S. (1938). **Iron-Haematoxylin Staining Technique: an Illusion.**—*Indian J. med. Res.* **26**. 259-260. [1 ref.]

When using Heidenhein's method of staining protozoa by an aqueous solution of haematoxylin preceded by mordanting in an aqueous solution of iron-ammonium-alum, it has always been emphasized that crystals of iron-ammonium-alum showing no signs of decomposition should be used, *i.e.*, crystals with a good violet colour should be used in preference to crystals with a deposit of insoluble basic alum.

The authors found that solutions made up in 0.5% sulphuric acid were equally satisfactory in use and remained perfectly clear for several months at a room temperature of 85°F.

They conclude that the only essential factor in producing a good iron haematoxylin stain is a good solution of haematoxylin.

- I. FLOSDORF, E. W., & MUDD, S. (1935). **Procedure and Apparatus for Preservation in "Lyophile" Form of Serum and Other Biological Substances.**—*J. Immunol.* **29**. 389-425. 11 figs., 2 tables. [Numerous refs.]
- II. FLOSDORF, E. W., & MUDD, S. (1938). **An Improved Procedure and Apparatus for Preservation of Sera, Microorganisms and Other Substances—The Cryochem-Process.**—*Ibid.* **34**. 469-490. 6 figs. [Numerous refs.]

I. A procedure and apparatus for the preservation of sera, bacterial cultures, viruses and other labile biological material are described in detail. In principle, the method consists of freezing the material rapidly at a very low temperature, and rapid dehydration from the frozen state by means of a high vacuum. The resulting product can be sealed off under the original vacuum, preserved and stored for at least ten months, and can easily and completely be brought to its original state by the addition of distilled water, without any loss of the original potency or value. The freezing mixture employed is dry-ice (solid CO<sub>2</sub>) dissolved in the methyl ether of ethylene glycol (methyl cellosolve), a temperature of -78°C. is maintained, and a pressure of less than 0.70 mm. Hg is required. Models are described for use in laboratories and hospitals and also those for production of the "lyophilic" serum on a semi-industrial and industrial scale. Full details of the apparatus and technique employed are available in the original, to which the reader is referred.

II. A further refinement of the technique for preserving sera and other substances in the dry state is described, involving a cheaper and more rapid process and leading to an improved product from the point of view of solubility and other characteristics. The principle consists in removal of water vapour by a specially prepared calcium sulphate ("drierite") which can be regenerated by heating to 150° or 200°C. at ordinary pressure. For serum, the product is degassed in a low vacuum, after which the dehydration takes place *in vacuo* in a special apparatus. The process can be accelerated by a preliminary freezing and the high vacuum required in the dry-ice process [see I, above] is not so necessary in the present case. Procedures for the desiccation of substances such as human milk, virus products and cultures are fully described, and the original should be consulted for full details of the apparatus and technique employed.—ALFRED EDEN.

BAUER, J. H., & PICKELS, E. G. (1937). **An Improved Air-Driven Type of Ultracentrifuge for Molecular Sedimentation.**—*J. exp. med.* **65**. 565-586. 13 figs. [Numerous refs.]

The authors give details of construction and operation of an improved type of air-driven ultracentrifuge operating in vacuum and suitable for the determination of sedimentation constants of protein molecules. The rotor has been run over long periods at a speed of 60,000 r.p.m., which corresponds to a centrifugal force of 260,000 times gravity in the centre of the cell. At this speed no deformation of the rotor, leakage of the cell, or vibrations in the centrifuge have been detected.

The adaptation of Svedberg's optical systems to this centrifuge for photographically recording the movement of sedimentation boundaries is described.

—R. ALLCROFT.

CHILES, J. A., Jr., & SEVERINGHAUS, A. E. (1938). **Hormone Studies with the Ultracentrifuge. I. An Improved Air-Driven Vacuum Ultracentrifuge Suitable for Concentration Work in Biological Experiments.**—*J. exp. Med.* **68**. 1-16. 7 figs. [2 refs.]

A detailed technical and structural description is given of an ultracentrifuge which holds ten test tubes and has a capacity of 55 c.c. : it is operated at a maximum speed of 51,000 r.p.m., which develops at the top of the fluid column in the test tubes a centrifugal field of over 100,000 times gravity.—R. ALLCROFT.

## MISCELLANEOUS

— (1938). **Second International Conference for the Protection of the Fauna and Flora of Africa : London, May, 1938. Final Act.** pp. 149. London : H.M. Stat. Off. [8vo] [2s. 6d.] [In English and French].

The deliberations were fundamentally of zoological interest, but the disease aspect was also considered. As part of the general agreed policy, exchanges of information on diseases and parasites of wild animals will in future be made between the participating nations.—J. E.

ANON. (1938). **Texte de la loi adoptée par la Chambre des Députés. Séance du 28 janvier, 1938, J.O., 29 janvier, 1938. [Text of a Law Regulating Veterinary Medicine, Adopted January, 1938].**—*Rev. Abatt.* **25**. 17-18.

This law restricts the practice of veterinary medicine, with certain exceptions, to French citizens who have the diploma of one of the French National Veterinary Colleges, or who hold the veterinary doctorate of the medical faculties of Paris, Lyons or Toulouse. The administrative and judicial authorities only recognize persons so qualified, who must register their names in their respective districts. A list of qualified practitioners is kept in each "département" and exhibited in each "commune".

It is illegal for unqualified persons to practise animal medicine and surgery, whether for remuneration or not. Certain exceptions are laid down : the most notable is the permission to those already practising to continue doing so for the duration of their lives, subject to the inscription of their names in a special register.

—D. H. WILLSON.

STUTZKI, H. (1937). **Die Geschichte und Entwicklung der deutschen tierärztlichen Zeitschriften. [History of German Veterinary Periodicals].**—*Inaug. Diss., Berlin.* pp. 79. [Numerous refs.]

This is evidently a complete history of periodical veterinary literature of

Germany, Austria and Switzerland. A total of 110 publications is referred to, of which 90 were of German origin.

The publications are dealt with chronologically, beginning with the *Magazin für Vieharzneikunst*, which appeared in 1784, and ending with the *Deutsche Tierärzteblatt* of 1984. Brief histories of defunct periodicals are given, and longer accounts of those still published, together with particulars concerning the editor, publisher and price.

There is an alphabetical index to the periodicals reviewed.—J. E.

- (1988). E. Merck's Jahresbericht über Neuerungen auf den Gebieten der Pharmakotherapie und Pharmazie. [*Merck's Yearbook*]. pp. 847. 26 figs, on 4 plates, 6 tables, 21 graphs. [Numerous refs.] Darmstadt: E. Merck. Chemische Fabrik. [8vo].

This contains seven general articles on medical chemotherapy, including one on the use of "vigantol" in veterinary medicine [see *V. B.* 9. 275.], and also descriptions of numerous drugs manufactured by Merck.—J. E.

- MOHLER, J. R. (1988). **Seventy-Five Years of Progress in Veterinary Medicine.** —*J. Amer. vet. med. Ass.* 93. 98-104.

This is an address given at the 75th annual meeting of the American Veterinary Medical Association. There is a brief reference to such workers as PASTEUR, LISTER, etc., and the earlier American workers, followed by a very long list of the outstanding achievements of the past 75 years, comprising discoveries in connexion with the causation, diagnosis and treatment of disease, and methods for the eradication of various affections in the United States.

The rest of the address touches lightly on such subjects as:—co-ordination of work in various states for the control of contagious disease; the influence of the aeroplane and other modern inventions on veterinary science and education; the importance of improved methods of breeding and of research in nutrition and genetics for the improvement of stock, and the benefit of proper veterinary supervision of meat inspection and milk supply.—F. J. ANDREWS.

- LETARD, E. (1988). Notes de voyage sur l'organisation de l'enseignement et des recherches vétérinaires, dans quelques pays étrangers. [*Notes on a Journey to Study Veterinary Organization, Education and Research in the U.S.S.R., Poland, and Czechoslovakia*].—*Rec. Méd. vét.* 114. 278-281.

The article is an account of visits to various veterinary schools and research institutes in the countries named. A description of the accommodation, staffing and the type of work pursued is given. The veterinary schools at Leningrad, Moscow, Kharkov, Warsaw, Lwów and Brno were visited, and institutes at Moscow and in Ukraine (Kieff).—D. L. HUGHES.

- GUENTHER, D. F. (1988). Erfahrungen über chinesische Landwirtschaft und Tierhaltung. [*Chinese Agriculture and Animal Husbandry*].—*Berl. Münch. tierärztl. Wschr.* July 22nd. 440-443, July 29th. 456-460, and August 5th. 472-476. 15 figs.

An account of general agriculture in North China during the years 1902-1909. A separate section is devoted to the general management and illnesses of each of the common domestic animals, *viz.* cattle, horses, sheep, camels, pigs and poultry, of which the fullest is the dealing with the Mongolian pony.—P. S. WATTS.

OFFICIAL AND OTHER REPORTS.

EXTRACTS FROM MUNICIPAL VETERINARY REPORTS, GREAT BRITAIN AND NORTHERN IRELAND.

1. ABERDEEN. (CITY). (1938). [**Report of Veterinary Services [1937]**]. [HOWIE, G.]—*Rep. med. Offr Hlth, Aberd., 1937.* pp. 60-64. 4 tables.
2. BELFAST. (COUNTY BOROUGH). (1937). **Report of the City Veterinarian for the County Borough of Belfast for the Year 1936.** [MCLEAN, A.] pp. 10. 8 tables. Belfast : S. C. Allen & Co. Ltd. [fcp].
3. BOLTON. (COUNTY BOROUGH). (1938). **Annual Report of the Veterinary Officer [1937]**. [HOLMES, R. P.]—*Rep. med. Offr Hlth, Bolton, 1937.* pp. 65-80. Numerous tables.
4. EDINBURGH. (CITY AND ROYAL BURGH). (1938). **Annual Report of the Veterinary Department for the Year 1937.** [GOFTON, A.] pp. 21. 6 tables. Edinburgh : Veterinary Dept. [8vo].
5. GLASGOW. (CITY). (1936). **Annual Report of the Chief Veterinary Inspector for the Year 1935.** [ABBOTT, S. G.] pp. 19. 3 tables. Glasgow : Robert Anderson & Sons, Ltd. [8vo].
6. GLASGOW. (CITY). (1937). **Annual Report of the Chief Veterinary Inspector for the Year 1936.** [ABBOTT, S. G.] pp. 18. 3 tables. [8vo].
7. LIVERPOOL. (CITY). (1937). [**Report on Food Inspection during 1936.**—*Rep. med. Offr Hlth, Liverpool, 1936.* pp. 225-266. Numerous tables.
8. LIVERPOOL. (CITY). (1938). [**Report on Food Inspection (1937).**—*Rep. med. Offr Hlth, Liverpool, 1937.* pp. 232-273. Numerous tables.
9. LIVERPOOL. (CITY). (1938). **Report of the Chief Veterinary Officer for 1937.** [MATTHEWS, H. T.] pp. 36. 6 tables. Liverpool : C. Tinling & Co., Ltd. [8vo].
10. MANCHESTER. (CITY). (1938). **Report on Veterinary and Public Health Work, 1937.** [LOCKE, R. C.]—*Rep. Hlth City Manchr, 1937.* pp. 52-66. 9 tables.
11. MANCHESTER. (CITY). (1938). **Report of the Markets Committee for the Year ending 31st March, 1938 [Food Inspection and Diseases of Animals]**. [JOHNSTONE, W. K.] pp. 27. 22 tables, 1 appendix. Manchester : Henry Blacklock & Co., Ltd. [8vo].
12. NEWCASTLE-ON-TYNE. (CITY AND COUNTY). **Annual Report of the Veterinary Officer for the Year 1937.** [THORNTON, H.] pp. 27. 18 tables. Newcastle-upon-Tyne : Christie, Malcolm, Ltd. [8vo].
13. PRESTON. (COUNTY BOROUGH). (1938). [**Report on Inspection and Supervision of Food [1937]**]. [FINCH, R.]—*Rep. med. Offr Hlth, Preston, 1937.* pp. 54-73. 8 tables.
14. SALFORD. (CITY). (1937). **Report Relating to the Meat and Food Inspection, Milk Supply, and the Diseases of Animals Acts [1936]**. [ALEXANDER, A.]—*Rep. med. Offr Hlth Salford, 1936.* pp. 139-149. 2 tables.
15. STOKE-ON-TRENT. (CITY). (1938). **Annual Report of the Veterinary Officer, Stoke-on-Trent, 1937.** [MANLEY, F. H.] pp. 9. 2 tables. Stoke-on-Trent : Publ. Hlth Dep. [fcp] [Mimeographed].
16. WEST HAM. (COUNTY BOROUGH). (1937). **Report of the Veterinary Officer for 1936.** [BYWATER, H. E.]—*Rep. Hlth Serv. West Ham, 1936.* pp. 102-118. 8 tables.

		MILK SUPPLY				
		Number of herds supplying milk				
		1	2	3	4	5
		Certified	Grade A (T.T.)	Grade A (Accredited)	Ungraded	Pasteurized
						Registered Herds/Shops
Aberdeen ...	14				1	58D
Belfast ...						61
Bolton ...			2P 1D	11P		120P 776D
Edinburgh ...	1P				2P	54P
Glasgow (5) ...	2P				98P	40
Glasgow (6) ...					89P	89
Liverpool (7) ...	1P 8D	3P 34D	58P 57D		5P 20D	747
Liverpool (8) ...	1P 7D	2P 32D	64P 62D		5P 20D	713
Liverpool (9) ...		1P	67P			222
Manchester (10)		1P 51D	11P 20D		24D	56
Manchester (11)						
Newcastle ...		1P	7P			20P
Preston ...			7D	28D	249D	10P 111D
Salford ...	16D		6D	1P 12D		420P 772D
Stoke-on-Trent		1P	41D	29P 8D		18D 146
West Ham ...	8D		11D	8D		109P 649D

NOTE. P = Producer, D = Dealer. Column

#### ADDITIONAL NOTES.

1. ABERDEEN.—Veterinary staff—one. Abattoir and meat market statistics are given.
2. BELFAST.—Veterinary staff—one. Abattoir statistics are given.
3. BOLTON.—Veterinary staff—one. Abattoir statistics are given.
4. EDINBURGH.—Veterinary staff—four. The report includes abattoir statistics, and figure for imported food rejected at the Port of Leith.
- 5 & 6. GLASGOW.—Veterinary staff—four. Abattoir, meat market and imported food inspection figures are given.
- 7, 8 & 9. LIVERPOOL.—Veterinary staff—three. Abattoir figures are given. Comparative figures of licensed cowsheds are given for the years 1932-1937, annual figures are given for veterinary examinations in the city cowsheds, for 1932-1937, and a table is included showing the amount of tuberculous milk sent in from the surrounding counties during 1936 and 1937.

				MEAT INSPECTION		NOTIFIABLE DISEASES (Still prevalent)					
7	8	9	10	11	12	13	14	15	16	17	18
Milch Cow Census	Samples Tested for TB.	No. Tuberculous	No. of Tuber- culous Udders	Tuberculous Bovines	Tuberculous Pigs	Bovine Tuber- culosis (includ- ing item 10)	Anthrax	F. & M. Disease	Swine Fever	Mange	Sheep Scab
359	457	39	1	279	13	2					
991				412	202	5					
2,685	220	27	2	1,037	579	14					
1,460	288	23	12	2,283	101	14	2			14	
1,214			2	1,718	155	68	3	1	4		
888			4	2,429	150	79	1		11		
3,230	487	6	60	4,985		88	1				
3,070	1,016	84	64	5,389	3,773	84	1				
3,070	274	31	30			65	3		1		
1,450	1,043	105	6								
				830	140	8	2		7	5	
477	14	3	2	216	69	4					
410	448	42		226	28	17	1				
	496	44							47		
2,095	785	40	20	299	77	66		1			
	56	4		677	1,072						

7 refers to cows within the urban district.

- 10 & 11. MANCHESTER.—Veterinary staff—one. The report includes abattoir figures, and a table showing the extent of TB. in milk from 1901-1937.
12. NEWCASTLE.—Veterinary staff—one. Abattoir figures are given, and the 1920-1937 figures are given of diseases in cows in the city, outbreaks of notifiable diseases in the city, and beef carcasses condemned.
13. PRESTON.—Veterinary staff—one. Abattoir figures are included, and statistics are given of animals examined at markets, for 1933-1937.
14. SALFORD.—Veterinary staff—one. The report includes abattoir figures, and the figures of tuberculous milk sent in from the surrounding counties during 1927-1936.
15. STOKE-ON-TRENT.—Veterinary staff—one. Abattoir figures are given.
16. WEST HAM.—Veterinary staff—two. Several tables of abattoir and meat inspection figures are given.

GREAT BRITAIN. (1938). **Statistical and General Report of the Army Veterinary Services, 1937-1938.** [MURRAY, C. A.] pp. 24. 10 tables. London: 'The War Office. [8vo.]

GENERAL.—The actual numbers, and the percentages of total strength, of admissions for treatment and of deaths among army horses and mules in the United Kingdom and Egypt are given, together with wastage due to castings for veterinary and other reasons.

There is nothing in the report calling for special notice except, perhaps, the great reduction in the number of animals dealt with, due to the mechanization of the Army.

EDUCATION.—No courses of instruction were held at the Army Veterinary School in Aldershot during the year, and only 21 farriers were trained at the School of Farriery.

RESEARCH.—The Laboratory continued the routine examination of specimens and the production of vaccines and biological products.—F. J. ANDREWS.

INDIA. (1937). **Agriculture and Animal Husbandry in India, 1935-36.** pp. 411. 2 plates, 19 tables, 1 map, 15 appendixes. Delhi: Manager of Publications. [4to] [Rs. 4-10] [7s. 9d.]

ANIMAL CENSUS.—The census of livestock taken in January, 1935, showed an increase in cattle and buffaloes and in goats, and a decrease in sheep. In British India alone, there were 125 million cattle and 94 million buffaloes, 25 million sheep, 37 million goats, 1½ million horses and ponies, 1½ million mules and donkeys and 600,000 camels. The value of exports of animals and animal products exceeded that of imports by over Rs. 90,000,000.

ANIMAL DISEASES.—Mortality among cattle from contagious disease was high, and of the 250,000 reported deaths, 55% were due to RINDERPEST. Against this disease 8,000,000 animals were inoculated, the "goat-tissue" virus being used in 57% and goat-blood virus in 12% of cases. SURRA was proved to be the cause of heavy mortality among cattle in some parts of India.

ANIMAL HUSBANDRY.—More interest in the improvement of livestock was taken in the provinces, particularly in the north, where the number of approved bulls at stud and the number of castrations of scrub bulls showed a steady increase.

RESEARCH.—Investigations were continued into the diseases of sheep, goats and poultry, and the appointment of a research officer was announced for systematic research on poultry diseases.

EDUCATION.—There were 522 students under instruction at the five colleges at the end of the year. 116 students passed the final examinations during the year. Madras University has recognized the Madras Veterinary College as a College of the University, and grants a degree of Bachelor of Veterinary Science.

FINANCE.—The expenditure of the Central and Provincial Veterinary Departments, details of which are given, showed a small increase, but the allotment is still quite inadequate for the needs of the country.—F. J. ANDREWS.

INDIA, ASSAM. (1937). **Report of the Civil Veterinary Department for the Year 1936-37.** [GHOSE, S. C.] pp. 85 + 2. 14 tables. Shillong: Assam Govt. Press. [8vo] [As 10] [1s.]

STAFF.—In addition to one Veterinary Investigation Officer, there were four Veterinary Inspectors, one (temporary) Johne's Disease Officer, and 60 Veterinary Assistant Surgeons.

FINANCE.—The total expenditure was Rs. 188,894.

ANIMAL DISEASES.—In equines, GLANDERS was reported from one district

only ; ANTHRAX and SURRA were also encountered. In bovines most of the common diseases were encountered, *e.g.* RINDERPEST, FOOT AND MOUTH DISEASE, and HAEMORRHAGIC SEPTICAEMIA. The deaths of 260 dogs from RABIES were reported.

PREVENTIVE INOCULATION.—ANTHRAX and HAEMORRHAGIC SEPTICAEMIA inoculations were also carried out. 111,859 animals were vaccinated against RINDERPEST with goat virus, with a mortality of 1.1%. CONTAGIOUS ABORTION of cattle and NEWCASTLE DISEASE of fowls were detected for the first time.

HOSPITALS AND DISPENSARIES.—The work of the Veterinary Hospitals at Gauhati, Silchar and Shillong is shown in a table. 6,094 animals were treated, and 499 castrations were performed.

SPECIAL INVESTIGATIONS.—The Veterinary Investigation Officer carried out work on 19 common local diseases during the year, particular attention being given to JOHNE'S DISEASE.

EDUCATION.—Four students from the Province were under training at the Bengal Veterinary College at Calcutta.—R. FISHER.

INDIA, BALUCHISTAN. (1938). **Report on Animal Diseases.**—*Adm. Rep. Baluchistan Agency, 1936-1937.* pp. 126-132 and 135. 7 tables.

All the information given is set out in a number of tables.

CONTAGIOUS DISEASE.—There were 500 deaths in eight outbreaks of ANTHRAX, 260 deaths in 12 outbreaks of BLACKLEG, 93 deaths in two outbreaks of RINDERPEST, 108 deaths in 66 outbreaks of FOOT AND MOUTH DISEASE, and 800 deaths in 24 outbreaks of SHEEP POX ; 1,500 goats died of SCAB. No RABIES was reported.

PREVENTIVE INOCULATIONS.—2,750 cattle were inoculated against BLACKLEG and 160 against RINDERPEST. 230 sheep were inoculated against ANTHRAX and 1,200 against SHEEP POX.

HOSPITALS AND DISPENSARIES.—The total number of animals treated was 92,000 (450 in-patients and 81,500 out-patients), and 360 castrations were performed. 64,000 animals were treated by veterinary staff on tour, and 122 animals were castrated.—F. J. ANDREWS.

INDIA, BENGAL. (1938). **Annual Report for the Civil Veterinary Department for the Year ending June, 1937.** [KERR, P. J.] pp. 50. 2 figs., numerous tables and appendixes. Alipore : Bengal Govt. Press. [8vo] [As 4 or 6d.]

STAFF.—Nine veterinary assistant surgeons were appointed, bringing the total staff to 150.

ANIMAL DISEASES.—The mortality total again increased despite a decline of about 9,000 in the deaths from RINDERPEST, which remained wide-spread. Goat tissue vaccine was alone used and is considered to have been responsible for the lower mortality reported. If sufficient staff had been available, more vaccinations would have been performed. There was a slight decrease in FOOT AND MOUTH DISEASE, but considerable increases in ANTHRAX, HAEMORRHAGIC SEPTICAEMIA and BLACKLEG. PARASITIC DIARRHOEA caused a considerable mortality among goats in Malda.

PREVENTIVE INOCULATIONS.—292,656 animals received goat tissue vaccine, and 745 government bulls received serum-simultaneous inoculations against RINDERPEST. 4,689 animals were vaccinated against ANTHRAX.

HOSPITALS AND DISPENSARIES.—10,991 animals were castrated and 117,640 animals were treated at 56 dispensaries or by veterinary assistants on tour.

SPECIAL INVESTIGATIONS.—Ten out of 127 cattle reacted positively to the double intradermal tuberculin test. BOVINE BRUCELLOSIS was found to be spreading among imported Jersey cows. Losses of calves due to DYSENTERY were found to

be associated with infection by *Trichomonas ruminantium*, *Embadomonas* and *Eimeria zürni*. Night blindness and OPTHALMIA in newly-weaned calves was ascribed to avitaminosis-A and was prevented by giving cod liver oil. Notes on other diseases under investigation are included.

EDUCATION—BENGAL VETERINARY COLLEGE. [MACGREGOR, A. D.]—184 students were under instruction, and 41 (65% of the candidates) passed their final examination. The Raymond Research Laboratory continued to carry out routine pathological work.—R. FISHER.

INDIA, BIHAR. (1938). **Annual Report of the Civil Veterinary Department for the Year 1936-1937.** [RILEY, P. B.] pp. iv + 80 + xxxix + 4. 14 tables, 1 map. Bihar : Supt. Govt. Printing. [8vo] [Rs 1-8-0].

STAFF.—The total staff numbered 188 and the budget was Rs 7.08.740.

ANIMAL DISEASES.—All the principal indigenous contagious diseases were present. The virulence of RINDERPEST and HAEMORRHAGIC SEPTICAEMIA was greater than during the previous year.

PREVENTIVE INOCULATIONS.—5,165 animals were given ANTHRAX antiserum, 27,784 HAEMORRHAGIC SEPTICAEMIA antiserum and 77,261 RINDERPEST antiserum, whilst goat tissue RINDERPEST virus was used on 848,087 animals.

HOSPITALS AND DISPENSARIES.—97,225 animals were treated and 104,998 castrations were performed at the 29 hospitals or by veterinary staff on tour.

SPECIAL INVESTIGATIONS.—Investigations were carried out by the Veterinary Investigation Officer on rinderpest, John's disease, surra, sterility, and abortion in cattle, and on anthrax and encephalomyelitis in horses.

EDUCATION—BIHAR VETERINARY COLLEGE. [DAVIS, R. T.]—Thirteen students attended during the year. 8,565 animals were treated in the College hospital. In the research laboratory the viability of RINDERPEST virus was studied.—R. FISHER.

INDIA, BOMBAY PRESIDENCY. (1938). **Annual Administration Report of the Civil Veterinary Department for the Year 1936-1937.** [FARBROTHER, E. S.] pp. 50. 17 tables. Bombay : Govt. Central Press. [8vo] [As 9 or 4d.]

STAFF.—There were three veterinary inspectors and 129 veterinary assistant surgeons on the staff.

ANIMAL DISEASES.—ANTHRAX, HAEMORRHAGIC SEPTICAEMIA and BLACKLEG were reported in cattle, and STRANGLES in horses ; TRYPANOSOMIASIS occurred in both horses and cattle. There were 518 outbreaks of FOOT AND MOUTH DISEASE and 1,894 outbreaks of RINDERPEST ; 79,278 cattle were attacked by these diseases, and 84,542 died. In other animals, RABIES, SHEEP POX and various fowl diseases occurred.

PREVENTIVE INOCULATIONS.—504 cattle were vaccinated against HAEMORRHAGIC SEPTICAEMIA and 12,147 against BLACKLEG, and 295,730 doses of RINDERPEST goat virus vaccine were prepared.

HOSPITALS AND DISPENSARIES.—112 of these are maintained, and there is also one travelling dispensary belonging to the S.P.C.A. 80,000 animals were treated, and 82,500 castrated.

EDUCATION—BOMBAY VETERINARY COLLEGE. [PHADKE, V. R.]—118 students attended the classes at the College ; of these, 11 passed the final year examination. Clinical instruction was given at the Bai Sakarbai Dinshaw Petit Hospital for Animals and at the Laboratory. The Ninth All-India Veterinary Congress was held at the College.

**BOMBAY CITY AND HARBOUR DEPARTMENT.** [PHADKE, V. R.]—3,221 horses were imported. One case of EPIZOOTIC LYMPHANGITIS was destroyed, and five cases of SURRA were successfully treated with naganol. Six suspected cases of GLANDERS were reported.—R. FISHER.

**INDIA, CENTRAL PROVINCES AND BERAR.** (1938). **Annual Report of the Civil Veterinary Department for the year ended March 31st, 1937.** [GAREWAL, J. S.] pp. 28. 14 tables, 1 appendix. Nagpur : Govt. Printing. [8vo] [Rs 1-8-0].

**STAFF.**—The staff numbered 168.

**ANIMAL DISEASES.**—Apart from a relatively small number of cases of ANTHRAX, HAEMORRHAGIC SEPTICAEMIA, BLACKLEG, TRYPANOSOMIASIS and PIROPLASMOSIS, 1,765 outbreaks of RINDERPEST and 1,725 outbreaks of FOOT AND MOUTH DISEASE were recorded.

**PREVENTIVE INOCULATIONS.**—11,088 animals were given anthrax antiserum, 164,000 were immunized against H.S., and 38,377 against blackleg. A centre for the preparation of goat and tissue rinderpest virus was opened during the year, and 405,320 doses of goat virus and 19,900 doses of the tissue vaccine were issued.

**HOSPITALS AND DISPENSARIES.**—Cases treated numbered 238,330, and castrations, 24,367. One hundred outlying dispensaries were operating during the year. Veterinary assistants on tour treated an additional 560,000 animals and castrated 143,152 animals.

**EDUCATION.**—Scholars from the Province were under training at the Bombay Veterinary College.—R. FISHER.

**INDIA, MYSORE.** (1938). **Annual Administration Report of the Civil Veterinary Department for the Year 1936-37, with the Government Review thereon.** [KRISHNIENGAR, K.] pp. 14. 3 tables, 1 map, 7 appendixes. [fcp].

**ANIMAL DISEASES.**—There were 1,414 outbreaks of ANTHRAX, 456 of HAEMORRHAGIC SEPTICAEMIA, 1,260 of BLACKLEG, 106 of RINDERPEST, and 230 of SHEEP POX.

**PREVENTIVE INOCULATION.**—19,992 animals were immunized against ANTHRAX, 30,350 against HAEMORRHAGIC SEPTICAEMIA, 88,095 against BLACKLEG and 38,520 against RINDERPEST (by goat virus). 41,115 sheep were immunized against SHEEP POX.

**HOSPITALS AND DISPENSARIES.**—At 72 dispensaries, 472,112 animals were treated and 26,500 animals castrated.

**SPECIAL INVESTIGATIONS.**—Various types of johnin were compared, and a local type is being standardized for use. Work was also done on the treatment of TRYPANOSOMIASIS, parasitic diseases, sterility (hormone treatment) and poultry diseases.—R. FISHER.

**INDIA, PUNJAB.** (1937). **Annual Report of the Civil Veterinary Department for the Year 1936-37.** [QUIRKE, T. F.] pp. ii + 41 + xxii. 10 figs. on 8 plates, numerous tables, 1 map, 6 diagrams. Lahore : Supt. Govt. Printing. [8vo] [As 4].

**ADMINISTRATION.**—The veterinary staff numbered 21 superintendents and 398 assistants, and the expenditure was Rs. 21,47,472.

**ANIMAL DISEASES.**—The total disease mortality recorded was 31,063. No case of ANTHRAX was recorded. Fourteen cases of GLANDERS were destroyed. HAEMORRHAGIC SEPTICAEMIA occurred in all districts except Simla, and was responsible

for 68 % of a total bovine mortality. BLACKLEG appeared in 18 districts. There were 3,762 cases of SURRA. RINDERPEST occurred in all districts except Simla. FOOT AND MOUTH DISEASE appeared in 18 districts.

PREVENTIVE INOCULATIONS.—537,789 animals were vaccinated against H.S. and 21,188 against blackleg, 169,116 were actively immunized against rinderpest and 58,917 cattle given rinderpest antiserum.

ANIMAL BREEDING.—The stock farm at Hissar is the largest breeding establishment in India. An increase in both the stock held and the stock issued is recorded. Hitherto draught oxen have been mainly developed, but now milch cows are being encouraged. There are also successful sheep, goat and donkey breeding sections. The farm is a valuable centre for disease research. Experimental fodder crops are also grown.

HOSPITALS AND DISPENSARIES.—There were 800 veterinary hospitals and an increase of 87 had been sanctioned. 1,637,507 animals were treated, and 271,789 animals castrated at dispensaries or by veterinary assistants on tour.

EDUCATION. PUNJAB VETERINARY COLLEGE. [TAYLOR, W.]—There were 133 students at the Punjab Veterinary College during the year.

SPECIAL INVESTIGATIONS.—Accounts of the work of the hospital and pathological and parasitological sections are described. The use of naganol in artificial infections of SURRA in dogs was investigated.—R. FISHER.

SOUTHERN RHODESIA. (1938). **Annual Report of the Division of Entomology for the Year Ended 31st December, 1937.** [CHORLEY, J. K.]—*Rhod. agric. j.* 35. 659-676.

Native cattle possess some degree of resistance to TRYPANOSOMIASIS and numerous natural recoveries take place, but such cases may "break down" under adverse conditions such as overwork, or if they contract some other disease: these deaths from TRYPANOSOMIASIS may occur many miles from the district where infection took place.

The policy of controlled and intensive game destruction with the object of creating a game-free buffer zone between the "fly" and the settlements has proved successful in stopping the advance of "fly" in all areas where it has been applied. It is considered that tsetse can be eradicated locally by a cautious extension of this policy in all tsetse fly areas without exterminating the game. The cost, both financial and ethical, has been great, and is an ever mounting total, and the question of reclaiming this land for which at the moment there is no immediate want is one which will soon demand an answer.—J. A. GRIFFITHS.

UNITED STATES OF AMERICA. (1937). **Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1937.** pp. vi + 164. Numerous tables, 1 chart, 2 photographs. Washington: United States Govt. Printing Off. [8vo] [60 cents].

The Division of Zoology carried out research on:—(1). TRICHINOSIS.—A new technique for ascertaining the number of trichina larvae produced by one female was elaborated. A report was published on the relationship between trichinosis in man and in pigs. Reference is made to the use of a skin test and of the precipitin test in the diagnosis of the disease in man. (2). AMOEBIASIS.—An investigation on the various sizes of cyst found was made. Dogs were infected with trophozoites.

—J. C. WALLACE.

## BOOK REVIEWS.

FELDMAN, W. H. [D.V.M., M.S. ; Associate in Division of Experimental Medicine, Institute of Experimental Medicine ; Associate Professor of Comparative Pathology, Mayo Foundation for Medical Education and Research, Graduate School, University of Minnesota]. (1938). **Avian Tuberculosis Infections**. pp. ix + 488. 109 figs., 17 tables. [Numerous refs.] London : Baillière, Tindall and Cox. [8vo] [31s. 6d.]

The author enjoys a wide reputation as an authority on avian TB. and has contributed many scientific articles of great value. He is, therefore, singularly well qualified to present a treatise on this subject.

The importance of this disease to the veterinarian is becoming increasingly apparent, but much of the recent information is scattered through the literature and is not readily accessible to the ordinary reader. His book therefore serves a most useful purpose, largely because he has collected into one volume all the important data relating to this subject.

The book is divided into 13 chapters and covers a wide field. It deals with the isolation and cultural characters of the organism, natural and experimental TB. in birds, and the pathogenicity of the bacillus for other species. In view of the importance of infection of cattle and pigs with *Mycobacterium tuberculosis avium*, a considerable section of the book is devoted to the significance of the organism in these species ; in this realm his views are orthodox and most instructive.

It is natural that in many places he deals extensively with general observations on the tubercle bacillus and has not confined his attention to the avian type in particular. In the opinion of the reviewer this approach to the subject does not detract from the value of the monograph ; indeed, in many respects it enhances its usefulness. Nevertheless, it may be suggested that in some places there is needless repetition. Thus, on pp. 130 *et seq.* the lesions of experimental TB. in the chicken are described in considerable detail and again in chapter VII ; while the changes induced in the g. pig are cited at length on pp. 127 *et seq.* and also on pp. 246 *et seq.* Other instances of redundancy could be mentioned.

The illustrations are clear and carefully chosen, and typify the various conditions they were selected to portray : in addition, each chapter is exceedingly well documented. The book can be warmly recommended both to the practitioner and to the laboratory worker.—R. E. GLOVER.

NIEBERLE, K. [Dr. med. vet. o. Professor und Direktor des Veterinär-Pathologischen Institutes der Universität Leipzig]. (1938). **Tuberkulose und Fleischhygiene**. [TB. and Meat Hygiene]. pp. viii + 100. 38 text figs., 40 figs. on 20 plates. Jena : Gustav Fischer. [8vo] [RM. 6].

This book represents an attempt to bring together within 100 pages of text the most important advances of recent years in our knowledge of the pathological anatomy and pathogenesis of TB. in domestic animals, and to apply this knowledge to the practice of meat inspection. In particular, those forms of TB. are considered in which authors have shown that infection of the meat with tubercle bacilli occurs. In a country in which a considerable amount of raw and partly cooked meat is consumed, this is clearly a matter of importance.

The first chapter deals in general with the reaction of the tissues of animals to tubercle bacilli, and shows briefly the variation in reaction in animals of different species infected with the same type of tubercle bacillus, and of animals within the same species infected with tubercle bacilli of different types, *e.g.* TB. in pigs due to bovine and avian bacilli.

The second chapter, of 58 pages, contains a wide study of primary infection and reinfection and their possible results. This represents a summary of the work already published by the author and his colleagues in a large number of papers during recent years [abstracted elsewhere in this *Bulletin*].

The third and last chapter includes the results of the bacteriological examination of meat carried out by Professor MEYN on selected cases of TB., by direct culture on Petraghani's medium and by g. pig inoculation. Out of a large number of cases, 80% of positive results were obtained. In histological sections it was frequently possible to demonstrate the presence of a tubercle bacillaemia, and this is illustrated by photographs.

The recommendations relating to meat inspection are those contained in the papers by the author and by VAN OYEN read at the 1938 International Veterinary Congress.

The natural colour photographs are the finest which we have seen in any text, and include the most characteristic lesions of bovine TB. No references are given, nor is there an index. The book should be in the hands of all who are interested in the problem of TB., whether research worker, meat inspector or general practitioner.—E. G. WHITE.

URBAIN, A. [Professeur au Muséum national d'histoire naturelle]. (1938). La réaction de fixation dans les tuberculoses humaines et animales. [**Complement-Fixation in Human and Animal TB.**] pp. 146. 15 tables. [Numerous refs.] Paris: Masson et Cie. [2nd Edit.] [8vo] [Fr. 28].

The technique of the c.-f. test is explained in a clear and simple manner; the modifications of several workers are discussed and each method is described in detail. In this respect the book should be of value to the laboratory worker.

A chapter is devoted to a comparison of the c.-f. test with the serum flocculation test; it is shown that these tests may be complementary to each other in the diagnosis of human TB.

From the statistics furnished by the author, the c.-f. test is seen to be very accurate in the diagnosis of many human tuberculous conditions; conversely the test is correspondingly accurate in non-tuberculous human subjects.

The results of numerous investigations upon the application of the test to animal TB. are cited. Although the test is accurate in a high percentage of instances, an allergic response by this method is not always present in cases with calcified and caseating lesions. In this respect the test is not so sensitive as the intradermal test. The numbers of poultry examined are too few for any definite conclusions to be drawn.

The bibliography is very extensive.—E. C. HULSE.

UEBERREITER, O. [Editor]. (1938). Fortschritte der neuzeitlichen Veterinärchirurgie. Festschrift Theodor Schmidt zu seinem Siebzigsten Geburtstage gewidmet von seinen Schülern und Freunden. [**Advances in Modern Veterinary Surgery. Festschrift to Theodor Schmidt on his 70th Birthday.**] pp. 232. 87 figs., 2 tables. [Numerous refs.] Berlin & Vienna: Verlag von Urban & Schwarzenberg. [8vo] [RM. 12].

This Festschrift takes the usual form of a collection of technical papers contributed by former pupils and friends of the recipient. In this case there are 25 papers on surgical technique and pathology. [Abstracts of the latter appear elsewhere in this *Bulletin*.—] E.

THE  
VETERINARY BULLETIN

Vol. 9.]

June, 1939.

[No. 6.]

## DISEASES CAUSED BY BACTERIA AND FUNGI

ALLISON, V. D. (1938). **Streptococcal Infections.**—*Lancet*. **234**. 1067-1070. 4 tables. [12 refs.]

After reviewing recent advances in the serological analysis of beta-haemolytic streptococci, A. gives examples of the way in which serological typing may be of value in tracing the source of infection. The Denham, Chelmsford and Doncaster outbreaks of tonsillitis and scarlet fever are quoted [*V. B.* **6**. 483, and **7**. 634]. He discusses the importance of accurate identification of streptococci by serological means in relation to the cross-infections which occur in hospital wards. Cases that are sometimes considered to be relapses may be due to fresh infection with streptococci of a different serological type.—D. L. HUGHES.

ANDERSON, E. O., & PLASTRIDGE, W. N. (1936). **A Report on a Control Program for Bovine Infectious Mastitis Based on Segregation of Infected Animals.**—*J. Dairy Sci.* **19**. 432.

Observations on the incidence of streptococcal mastitis in seven experimental herds in Connecticut over periods of 1-5 years are described. The results show that a segregation policy can reduce infection 50-100 %, and that by this method infection-free herds can be built up.

- I. WHITE, G. C., COUTURE, G. W., ANDERSON, E. O., JOHNSON, R. E., PLASTRIDGE, W. N., & WEIRETHER, F. J. (1937). **Chronic Bovine Mastitis and Milk Yield.**—*J. Dairy Sci.* **20**. 171-180. 2 tables, 3 graphs. [7 refs.]
- II. SHAW, A. O., HANSEN, H. C., & NUTTING, R. C. (1937). **The Reliability of Selected Tests for the Detection of Mastitis.**—*Ibid.* 199-203. 1 table. [11 refs.]

I. Milk yields of cows negative to laboratory tests for mastitis were compared with yields from the same animals after they had been artificially infected and were in the incipient and mild stages of the disease. Two herds were used (comprising 52 animals) which were free from TB. and *Brucella abortus* infection, and comparatively free also from other disease conditions. Ninety normal and 108 infected lactations were recorded; cows with greatly diminished yields were excluded. The normal yield, calculated for a period equal to that of the experiment, of one herd (32 cows) whilst healthy was 9,557 lb., but when tests for mastitis were positive its yield calculated on the same basis was reduced by 463 lb. or 4.85 %. In the other herd (22 cows) the loss was about the same. Apart from other considerations, the loss of milk alone would hardly justify disposal of cows positive

to tests for incipient mastitis. When only one quarter was involved the losses were slight, but they were increased as infection spread to other quarters. The loss was about 15-20% when all the quarters were affected.

II. An attempt was made to determine the relative accuracy of the more common laboratory tests for mastitis, by examining milk from five cows having acute mastitis, two cows with mild chronic mastitis, and three cows having no detectable infection. In all, 518 samples were examined during 14 days.

Samples were incubated for 12 hours and examined for streptococci. They were then plated on beef infusion agar with 1% dextrose and not less than 5% defibrinated blood. Leucocyte counts were made and chloride percentages and the pH were estimated. Haemolytic bacteria were demonstrated in 82.5% of samples from cows giving abnormal milk, in 25% from cows with mild chronic mastitis and in 1.9% from definitely negative cows. Streptococci were demonstrated in 92.5% of samples of abnormal milk, in 36.6% from cows with mild chronic mastitis, and in 7.1% from cows definitely free of mastitis. 100,000 or more cells were noted in 87.7% of abnormal milk samples, in 27.7% of samples from mild chronic mastitis and in 5.8% from negative cases.

Tests for chlorides and pH were extremely unreliable for the detection of cows affected with chronic mastitis.—H. E. BYWATER.

WARD, A. H. (1938). **Preliminary Report on Inheritance of "Susceptibility" to Severe Udder Infection (Mastitis).**—*N.Z. J. Sci. Tech.* 20. 109A-114A. 2 tables. [2 refs.]

W. analysed the records of nine herds comprising 709 daughter-dam pairs. The diagnosis of mastitis rested on the leucocytic assessment of gravity cream as elaborated at the Wallaceville Laboratory. The results of the examination provided apparently significant evidence that hereditary factors contribute towards "susceptibility" to mastitis.

The progeny history of twin sires appeared to support the above conclusion, but W. states that the support is subject to qualification owing to the small numbers used (25 dams in one case and 22 in the other).—L. W. N. FITCH.

I. BROCC-ROUSSEU, D., & URBAIN, A. (1938). Sur la durée du pouvoir antigène du streptocoque gourmeux tué par l'alcool-éther. [**The Duration of the Antigenic Power of *Str. equi* Killed by Ethyl Alcohol**].—*C. R. Soc. Biol. Paris*. 127. 1400-1401. [8 refs.]

II. UMENO, S. (1938). **On the Colony-Type of *Streptococcus equi*. I. Comparison of the Morphological, Cultural and Biological Characteristics between Three Isolated Colony-Types.**—*Kitasato Arch.* 15. 262-283. 4 figs. on 1 plate, 6 tables. [Numerous refs.] [In English].

I. After being killed with alcohol and stored for 20 years, *Str. equi* possessed some antigenic power, but this was considerably diminished. Intravenous injection of a horse on three successive days with rising amounts of the preparation caused febrile symptoms. Twelve days later its serum contained only 15 antibody units, and had no protective value.

II. U. studied three colony types obtained by plating on agar 18-20 hour broth cultures of 60 stock and 27 freshly-isolated strains of *Str. equi*. The latter all belonged to a so-called "G" type, but older stock strains yielded colonies of a "C" type together with those of the "G" type. After 2-4 years in stock, only the "C" type was found, and among strains of over five years an "F" type occurred alone or with the "C" type. Differential characters on solid and in liquid media are described, as well as morphological features. Several tables

illustrate the relation between age of sub-culture and colony type, and the differences in haemolysis on solid and in liquid media, in antifuorescent action on films of *Pasteurella suisepitica*, and in fermentation tests.—R. O. MUIR.

GARGANGO, P. (1938). Sierovaccinoterapia nell'adenite equina. [**Sero-Vaccination against Strangles**].—*Azione vet.* 7. 368-369.

An inadequate account of the treatment of seven cases of strangles with a strangles sero-vaccine.

STITZ, B. (1938). Die Diplokokken-Infektion bei Haustieren unter besonderer Berücksichtigung der Zugehörigkeit des Erregers zu den Pneumokokken. [**Diplococcal Infection of Domestic Animals and its Relation to Pneumococcal Infection**].—*Vet.-med. Nachr. Bayer-Meister Lucius.* 3. 53-69. [16 refs.]

S. describes the occurrence of a specific disease of calves, sheep, horses and swine, caused by a diplococcus. He states that the disease occurs commonly in the above-mentioned animals and also in laboratory animals and in furbearers, and that the organism in question is really the pneumococcus. The disease is only encountered in a sporadic form, and no extensive outbreaks have been noted. Amongst cattle and sheep the disease chiefly affects young animals, and occurs as a septicaemia which generally ends fatally in the course of 1-2 weeks. Amongst horses the affection may apparently occur in a septicaemic form, a pneumonic form or as a chronic joint disorder. In swine the disease is a generalized condition frequently causing abortion in pregnant sows.

The appearance of the disease in the above animals is described in some detail, but it is stressed that neither in the symptomatology nor in the P.M. lesions are there characteristic features to aid diagnosis. In this connexion there is one exception, namely that the spleens of affected calves are said to have a characteristic elastic consistency. Diagnosis of the infection can only be made if a bacteriological examination reveals the presence of the pneumococci in the tissues and no other disease-producing organism or agent can be found.—E. J. PULLINGER.

I. BIGGER, J. W. (1937). **The Staphylococci Pathogenic for Man.**—*Brit. med. J.* Oct. 30th. 837-841. [Numerous refs.]

II. ANON. (1937). **The Immunology of Staphylococcal Infections.**—*Ibid.* 860-861.

I. A review of recent research on the toxins and other substances secreted by staphylococci, and of the methods of titrating antitoxic sera. The common staphylococcal infections of man and their treatment are discussed, and it is pointed out that although patients with chronic infections may have high contents of antitoxin, beneficial results may be obtained by immunization. Susceptibility to infection does not depend solely on antitoxin content, but also on other factors, such as general peculiarities of metabolism, skin and secretions. The use of both autogenous vaccines and of toxoid is advised.

II. This is an editorial article in which the value of antitoxin in treatment and the comparative values of toxoid and vaccines [mentioned in I, above] are discussed. It is pointed out that titration of antihæmolysin content is useless as a guide to the response induced by treatment. Animal experiments have shown that it is difficult to produce a high degree of immunity against staphylococci. Animals inoculated with live cultures may recover and develop antitoxin, but the cocci may survive in such tissue as kidney and bones, with resultant chronic osteomyelitis.—C. McGAUGHEY.

ZIRONI, A. (1988). Sur la pathogénie des infections staphylococciques. [**The Pathogenesis of Staphylococcal Infections**].—*Rev. Immunol.* 4. 180-145. [Numerous refs.]

Z. points out that since the discovery of formation of toxin by staphylococci there is too great a tendency to attribute the pathogenicity of staphylococci to the toxin, and to overestimate the value of antitoxin in connexion with prophylaxis. He maintains that whilst toxin plays an important part there are other very important factors to be considered. He compares his findings with those of other investigators, and gives his evidence for regarding the symptoms and anatomical lesions met with in such infections as being for the most part an expression of an allergic state.

—GWILYM O. DAVIES.

UMENO, S., & NOBATA, R. (1988). On the Viability of Anthrax Spores.—*J. Jap. Soc. vet. sci.* 17. 221-228 of pt. 1. [5 refs.] [In Japanese: abst. from English summary p. 87 of pt. 2].

Anthrax spores stored in the laboratory survived for at least 40 years.

The identity of the growths obtained from the spores was established by the examination of cultural and microscopic characters, by the inoculation of mice, and by the precipitation test.—D. D. OGILVIE.

CURASSON, K. G. (1988). Sur l'action pathogène naturelle du bacille pyocyaneque. [**Pathogenicity of *Pseudomonas pyocyanea* ("Bacillus pyocyaneus")**].—*Bull. Serv. Zootech. Epiz. A.O.F.* 1. No. 1. 1-6. [7 refs.]

The action of *Ps.p.* in animals is discussed from the pathological and bacteriological viewpoints. Symptoms produced in horses, sheep, dogs, fowls and pigeons are described in some detail, and the particular strains of the organism which infect each of these species are indicated. In horses, naso-pulmonary and intestinal symptoms are described; C's strain No. 1 was associated with cases in which the chief symptoms were naso-pulmonary and his strain No. 2 with those in which the chief symptoms were abdominal.

He stresses the comparative absence of P.M. signs, other than generalized congestion, especially of the liver, in animals dying from *Ps.p.* infection. He records the recovery of the organism in pure culture from heart blood and bone-marrow of a fowl.

Rabbits and g. pigs sometimes develop a secondary infection with *Ps.p.* following infection with anthrax bacilli, pasteurella, or salmonella. It is noted that the degree of pigment production varies with the strain.—H. BURROW.

LONG, E. R. (1988). Tuberculosis, Leprosy and Allied Mycobacterial Diseases. —*Science.* 87. 28-31.

L. discusses the principal features of TB., leprosy, the "skin-lesion" disease of cattle, Johne's disease, rat "leprosy" etc., with a view to explaining why, when the causal organisms have so many features in common, there should be so much variability in the diseases produced.

It is stated that little is known of the chemistry of the body cells in the lesions, but much information is available concerning the chemistry of artificially grown mycobacteria. There are distinctive qualitative and quantitative differences between the lipoids, proteins and carbohydrates within members of the group of mycobacteria, and as these substances vary in their actions on the tissues, differences in the lesions are understandable. The lipoids are stated to stimulate the large mononuclear phagocytic cells and to lead to chronic changes, whereas the inflammatory exudations and toxic necroses are the result of protein, and

possibly carbohydrate action, particularly after "hypersensitiveness" has been induced in the course of the disease. The development of epithelioid cells is due to the dispersal of certain phosphatides and fatty acids derived from breakdown of the acid-fast bacilli. It is also stated that typical epithelioid tubercles can be induced at will in experimental animals by the injection of lipoids alone.

—GWILYM O. DAVIES.

SCHULTE, W. (1937). Ueber das Vorkommen von Tuberkulose in den innersekretorischen Drüsen beim Rinde. [**TB. of the Endocrine Glands in Cattle**].—*Inaug. Diss., Hanover*. pp. 31. [Numerous refs.]

Tuberculous lesions were found in the adrenal glands in five cases, and in the thyroid glands in one case, out of 82 cases of chronic TB. in cattle, but no lesions were found in the hypophyses, the pineal bodies, the thymus or the parathyroid glands in these cases. The size, the amount of reticulo-endothelial tissue, the function of these glands, and their blood supply are discussed in relation to these results.—A. T. PHILLIPSON.

FØLGER, A. F. (1938). Tuberkulosens patologiske Anatomi med særligt Henblik paa Bestemmelse af tuberkuløses Processers Alder. [**The Pathological Anatomy of TB. with Special Reference to the Age of TB. Processes**].—*Medlemsbl. danske Dyrlægeforen.* 21. 289-303, 317-333, 347-359 and 373-380. 4 figs.

A survey is given of the modern views on the pathological anatomy of TB., especially as it has been modified by the works of HÜBSCHMANN and, in the field of veterinary science, by NIEBERLE.

The subject has been divided up as follows:—(1) organs in which "primary complexes" often develop; (2) TB. of the lymph nodes, and (3) organs in which TB. processes develop as a tuberculous infection spreads and becomes generalized, forms of sensitization being also mentioned under this head. When the age of tuberculous processes is being judged, an exact and complete P.M. examination must be made. The new views are in many respects in agreement with regulations in force for meat inspection, but examples are mentioned where a revision seems to be necessary.—H. C. BENDIXEN (COPENHAGEN).

DEBELIĆ, Š. (1938). Tuberkuloza kod goveda zaklanih na zagrebačkoj klanici. [**TB. in Cattle Slaughtered at Zagreb, Yugoslavia**].—*Vet. Arhiv.* 8. 460-467. 1 table. [German summary].

TB. was observed in 0.51% of 200,000 adult cattle slaughtered at the Zagreb abattoir, Yugoslavia, during the past ten years. These figures show that TB. is fairly rare among Yugoslavian cattle, and that steps should be taken as soon as possible to control the disease.—B. OSWALD (KRIŽEVCI).

CRAIG, J. F., & DAVIES, G. O. (1938). **Tuberculosis in a Sheep**.—*Vet. Rec.* 50. 1156-1157. 1 fig. [6 refs.]

Tuberculous lesions were observed in the submaxillary, mesenteric, hepatic, bronchial and mediastinal lymph nodes, and in the liver and lungs. The lungs were extensively involved and numerous caseo-calcareous nodules were distributed throughout the fibrous matrix. Numerous beaded tubercle bacilli were observed in the caseo-pus. Typical generalized tuberculous lesions were found in a g. pig and a rabbit after subcutaneous inoculation; no lesions were found in two fowls. The infection appeared to be of bovine origin.—E. C. HULSE.

CARPANO, M. (1936). Sulla tubercolosi degli animali de giardini zoologici. [**TB. in Animals in Zoological Gardens**].—*Bull. vet. Serv., Minist. Agric., Egypt*. No. 171. pp. 10. 2 tables. [1 ref.] [In Italian: English and French summaries].

C. remarks on the frequency of TB. amongst animals in zoological gardens, not only in mammals, of which monkeys especially are affected, but also in birds and some reptiles. He concludes that liability to the disease is provoked by change of climate and the conditions of life in captivity.

Probably some infected animals are admitted, and there is always the danger of infection from attendants or visitors. He gives a list of 84 deaths from this disease in the last ten years in the zoological gardens at Cairo, and suggests certain precautionary measures, including the tuberculin test upon admission, immediate segregation of affected animals, disinfection, inspection of food supplies, heating of milk, and avoidance of overcrowding.—S. F. J. HODGMAN.

ROWLANDS, W. T., & MONTGOMERIE, R. F. (1938). **The Eradication of Tuberculosis from a Cattle-Breeding District in North Wales**.—*Vet. Rec.* 50. 1579-1585. 2 tables. [8 refs.]

This is an account of a survey of the eradication of TB. in a breeding district in Merioneth, North Wales, 800-900 feet above sea level. The initial test was carried out on 40 small farms, with an average of 15 cattle on each farm. The incidence of TB. amongst the herds was approximately 5%. After the first test, 30 owners came into the scheme, and later the number rose to 39. At the initial test in December, 1935, 4.9% of a total of 470 animals reacted, on 30 farms. By October, 1937, this percentage was reduced to 0.52% of 572 animals on 39 farms. The reactors detected at this test were recently purchased animals.

As a result of the testing, the demand for tubercle-free cattle from the district exceeded the supply, and the prices obtained varied from £3 to £5 above the ordinary market value. The result of this experimental scheme encouraged other farmers outside the original district, in the County of Merioneth, to apply for the attestation of their herds.

From the result of the investigations it appears comparatively simple to establish clean herds in the upland areas in breeding districts where few animals are imported.—BRENNAN DEVINE.

LAJA, F. (1938). K volrosu o borjbe s tuberkulezom. [**Control of Bovine TB. in Estonia**].—*III. Balti. Valsty. vet. Kongr. Protokol. 1937*. pp. 24-33. 1 table. [In Russian].

The methods used for the control of TB. in Estonia, including arrangements for compensation of owners, are described. L. considers that the ophthalmic test is the most reliable diagnostic method, but that, owing to the difficulty in interpreting the tuberculin test, a more reliable result can be obtained by using two different tests simultaneously. In the U.S.S.R. an increase of skin thickness of 4 mm. is considered negative in intradermal tuberculin tests, one of 4-7 mm. is considered doubtful, and an increase of over 7 mm. is considered positive. In some countries a thickening of as little as 2 mm. is considered a weak positive; this divergence of views leads to considerable confusion. L. agrees with the view that the reaction should be judged not so much on the size as on the nature of the swelling, attention being paid to its sensitivity and temperature, and also to its duration.

CARPANO, M. (1936). Sulla necessità d'intensificare in Egitto la lotta contro la tubercolosi degli animali domestici. [**The Control of TB. in Domestic**

**Animals in Egypt].—Bull. vet. Serv., Minist. Agric., Egypt. No. 162. pp. 12. 1 table. [In Italian].**

C. discusses the general question of the spread of TB. among domestic animals with reference to economic losses and danger of infection to human beings. In Egypt the available data as to the prevalence of the disease are almost entirely confined to reports from abattoirs. Bovine TB. is exceedingly rare in Abyssinia, Eritrea, the Sudan and Cyrenaica; it is more frequent in Egypt, especially in the Delta, where the population is denser and the animals are mostly stall-fed. C. recommends sundry hygienic measures, registration of cattle, systematic tuberculin tests, and regulation of the sale of milk, and insists on the necessity of securing public co-operation by means of propaganda.—S. F. J. HODGMAN.

BLOCH, F., & COSTIL, L. (1938). Réactions de la membrane chorio-allantoïde de l'embryon de poulet aux bacilles tuberculeux bovins. [**Reactions of the Chorio-Allantoic Membrane of the Chicken Embryo to Bovine Tubercle Bacilli**].—*C. R. Soc. Biol. Paris*. 128. 849-851. [1 ref.]

On the third day after inoculation the membrane was oedematous and thickened. Microscopically there was considerable leucocytic infiltration of the mesoderm, and perivascular histiocytic nodules containing numerous bacilli were observed. By the fifth day the bacilli were penetrating to the ectodermal surface. On the seventh day, white opaque nodules were just visible; the bacilli were very numerous and clumped together in the centre of the nodules. Similar changes were observed after the inoculation of human tubercle bacilli.—E. C. HULSE.

I. CHITI, G. (1938). Versuche einer Differenzierung der säurefesten Bakterien mittels des Agglutinationsverfahrens. Die Unterscheidung der Tuberkelbazillen des Typus gallinaceus von den Säugetiertuberkelbazillen. [**Attempts to Differentiate Acid-Fast Bacteria by Agglutination. Differentiation of Avian from Mammalian Tubercle Bacilli**].—*Zbl. Bakt. I. (Orig.)*. 142. 303-312. 2 tables. [13 refs.]

II. CHITI, G. (1938). Gelingt es, Tuberkelbazillen des Typus gallinaceus nach Wachstum in flüssiger Kultur von anderen Säurefesten sicher zu unterscheiden? [**Differentiation of Avian Tubercle Bacilli from other Acid-Fast Bacilli, after Growth in Liquid Medium**].—*Ibid.* 313-316. [3 refs.]

I. By means of serological absorption tests C. showed that avian tubercle bacilli were antigenically distinct from the mammalian types, and also that the avian type did not itself constitute one homogeneous antigenic group.

II. C. does not consider that the nature of growth in fluid medium constitutes a reliable criterion for distinguishing the avian from the other types of acid-fast bacilli, and states that "S" forms cannot be relied upon to behave characteristically in this respect.—E. J. PULLINGER.

GRIFFITH, A. A., & SMITH, J. (1938). **Bovine Phthisis. Its Incidence in North-East Scotland. County and City Cases.**—*Lancet*. 234. 739-742. 2 tables. [1 ref.] [Also appeared in *Rep. med. Offr Hlth, Aberd., 1937.* pp. 1-5].

From about 1934 onwards, investigations which gradually extended to the whole of north-east Scotland were made as to the proportion of cases of pulmonary tuberculosis in man caused by the bovine type bacilli. The proportion of bovine to human type infections in 1935 was 18:90. The total number of cases which yielded cultures of bacilli during the whole period of the survey was 636, all but one of which were obtained from the sputum. Forty-four of these strains were typically bovine by culture and rabbit inoculation. Of the 44 bovine type cases,

18 were city inhabitants and 81 were country people, but many of the city patients had been brought up in the country or had spent holidays there.

AUBERTIN, E., RICHARD, J., & PERRINEAU, G. (1988). Ostéoarthritis fongueuses produites chez le lapin par une variété particulière, très peu virulente, de bacilles acidorésistants, après surinfection par des bacilles bovins virulents. [*Osteoarthritis Produced in Rabbits by a Variety of Acid-Fast Bacilli of Very Low Virulence, after Superinfection with Bovine Tubercle Bacilli*].—*C. R. Soc. Biol. Paris*. 127. 1101-1104.

On subcutaneous inoculation, this strain produced a caseating lesion at the inoculation site in rabbits. By superimposing an inoculation (subcut.) of 0.0001 mg. of virulent bovine bacilli, osteoarthritic lesions were produced. In most cases lesions were observed in the intervertebral articulations; numerous acid-fast bacilli were observed, of which the cultural characteristics resembled the original strain of low virulence. As the result of the infection with the acid-fast bacillus of low virulence, the lesions produced by the bovine strain were atypical, and its virulence appeared to be greatly diminished.—E. C. HULSE.

GREENE, R., & MORGAN, H. R. (1988). Influence of Progesterone on Experimental Tuberculosis in Male Guinea Pigs.—*Proc. Soc. exp. Biol., N.Y.* 38. 656-658. 1 table. [2 refs.]

As the condition of tuberculous patients has been observed to improve during the early months of pregnancy, the authors decided to investigate the possible influence of the hormone progesterone on the course of experimental TB. Male g. pigs were chosen, as the authors considered that fluctuating hormone secretion from the ovaries in females might interfere with the results. Twenty male g. pigs were inoculated subcutaneously with 1 mg. of the C8 strain of tubercle bacillus, and ten were given 0.5 unit of progesterone (subcut.) three times weekly for six weeks. The hormone did not retard the development of TB., nor did it alter the skin sensitivity to tuberculin. The authors suggest that the experiments might with advantage be repeated with female g. pigs.

RAJAGOPALAN, V. R., & GOPALAKRISHNAN, V. R. (1988). The Occurrence of *Corynebacterium equi* in a She-Buffalo.—*Indian J. vet. Sci.* 8. 225-284. 1 text fig., 1 fig. on 1 plate, 2 tables. [8 refs.]

A diphtheroid organism, isolated from the vaginal discharge of a buffalo cow after abortion, showed morphological and cultural characters and biochemical reactions identical with those of *Corynebact. equi*, which is recognized as a cause of specific pneumonia in foals.

Cross-agglutination tests with the diphtheroid and a strain of *Corynebact. equi* from foal pneumonia against the homologous antisera were negative, but complement-fixation tests established the complete affinity of the two strains. Like *Corynebact. equi*, the diphtheroid was non-pathogenic for rabbits, g. pigs and mice, while it caused a fatal pyaemic pneumonia in a 14-day-old foal on nasal instillation. Intravaginal instillation of 5 c.c. of a saline emulsion of the diphtheroid, given also orally, failed to induce abortion in a cow at the ninth month of pregnancy. No lesions developed in two calves, 2-8 months old, which were swabbed intranasally with a saline emulsion in an attempt to produce pneumonia or pyaemic arthritis.

—R. O. MUIR.

WEINBERG, M., FORGEOT, P., & MERLE, A. (1988). Contribution à l'étude expérimentale du B. de Poëls, l'un des principaux agents des complications gangréneuses de la fièvre aphteuse au cours de la récente épidémie observée

en France. [Experimental Study of *Corynebacterium pyogenes bovis*, an Important Agent of Gangrenous Complications in the Recent Outbreak of Foot and Mouth Disease in France].—*Bull. Acad. vét. Fr.* 11. 525-534. [8 refs.]

Two cows were experimentally infected with the most pathogenic of several strains of *Corynebact. pyogenes*, one by three increasing intravenous doses at intervals of 25 and 11 days, and the other by a single intramuscular dose. An acute abscess developed at the site of inoculation in the first cow with a resultant loss of condition and, after several months, paralysis of the limbs due to chronic suppurative arthritis of the fetlock and pastern joints. After slaughter, *Corynebact. pyogenes* was isolated from several organs and from an affected joint. The other cow developed a large intramuscular abscess from which the organism was recovered a month later. The abscess was reabsorbed after a course of vaccination. Neither a local nor a general reaction was produced in a healthy cow by vaccination with a small dose of anaculture. Cultures isolated later from the two cows showed no increase in virulence for g. pigs or rabbits. Calves born after infection did not exhibit immunity to an intramuscular injection of *Corynebact. pyogenes*.—R. O. M.

HAMMERSLAND, Hazel, & JONESCHILD, E. M. (1937). **Pseudotuberculosis of Deer.**—*J. Amer. vet. med. Ass.* 91. 186-192. 1 fig. [3 refs.]

On P.M. examination of a deer, abscesses were found in the parietal and visceral pleura and in the subcutaneous tissues round the horns and parotid region. From these lesions, an organism identical with *Corynebacterium ovis* was isolated. Inoculation of g. pigs, rabbits and mice with suspensions of the organisms resulted in multiple abscess formation. Dogs and chickens were not susceptible.

Only three cases of pseudotuberculosis in deer are known to the authors.

—HUGH N. SPEARS.

PENHA, A. M. (1937). Contribuição ao estudo da peste dos "polmoes" (pyobacillose dos bezerrros). ["**Peste dos Polmoes**" (Skin Infection Due to *Corynebacterium pyogenes*) of Calves].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* 8. 189-196. 4 figs. on 2 plates, 2 tables. [20 refs.] [English summary].

Infection of the skin with *Corynebact. pyogenes* is described. The organism was demonstrated in unopened abscesses.—S. TORRES.

I. HART, L. (1938). **The Occurrence of Swine Erysipelas in New South Wales.**—*Aust. vet. J.* 14. 12-15. 1 fig. [10 refs.]

II. PULLAR, E. M. (1938). **Swine Erysipelas in Victoria.**—*Ibid.* 16-22. 1 fig. [11 refs.]

I. H. describes the isolation from two pigs of an organism having the morphological, cultural and pathogenic characters of *Erysipelothrix rhusiopathiae*. One strain was isolated from a suckling in which the infection was bacteraemic or septicaemic, and the other from typical lesions of verrucose endocarditis, in an older pig on a different farm. Two other suspicious sporadic cases in N.S.W. are mentioned. These are the first recorded instances of S.E. in this State, although an organism which is culturally and serologically indistinguishable from *E.r.* commonly causes polyarthritis in young sheep.

II. The first recognized outbreak of S.E. in Victoria is described. It affected about six porkers in a small herd of Large White pigs on a wheat farm in the north west of the State. *E.r.* was isolated from one case and confirmed serologically, a detailed description of the strain being given. Sera from the rest of the herd

were tested and 15 gave complete agglutination at 1 : 100, but on retesting with higher dilutions only three were of interest (two at 1 : 160 and one at 1 : 320). The difficulty of interpreting agglutination at 1 : 100 is shown by the fact that of five apparently normal pigs kept at the laboratory, two gave partial agglutination at this titre. The two animals showing 1 : 160 and the one showing 1 : 320 were retained for observation for some three months. One with a titre of 1 : 160 maintained this level, but showed no symptoms, and at autopsy no lesions were found and no growths occurred. The other two were arthritic and their titres increased considerably. In one, joint lesions were slight on autopsy and no cultures of the organism were obtained, whereas the other showed well marked, multiple joint lesions and slight verrucose endocarditis, and the organism was recovered in pure culture from an affected joint.

Possible sources of infection are discussed. There had been no contact with other swine, nor had pork scraps or garbage been fed. The disease occurred shortly after the pigs were put in a large, bare paddock and fed on barley from a self feeder. There were sheep on the property, but no cases of arthritis had occurred amongst them. Poultry had been in the paddock, some of which had been lame, and the carcasses of those which died were eaten by the pigs. Although infection may have arisen from the poultry, it is considered on the whole more likely that it was due to infection of the barley by mice in the feed shed.—D. A. GILL.

MURNANE, D. (1938). **Arthritis in Lambs.**—*Aust. vet. J.* **14**. 23-36. [12 refs.]

While this disease sometimes affects lambs prior to castration and docking, it usually occurs as a sudden outbreak affecting a large percentage of the lambs, some 10-14 days after these operations. Both sexes and all breeds seem equally susceptible. The limb joints are most commonly affected, and since movement is painful the lambs do not feed normally, and lose condition. About 75% recover completely in 3-4 weeks, about 5% die, and the remainder are chronically affected with lameness and deformity of joints. The lesions in the joints in the acute stage are inconspicuous, but in the chronic form there is erosion of the articular surfaces, cloudy and flocculent synovia and commonly some degree of ankylosis.

The disease is due to an organism which is present in the affected joints in pure culture. While it appears to be identical with *Erysipelothrix rhusiopathiae*, and while European and American workers have also assumed it to be identical, M. points out that, while the organism of ovine arthritis is intensely pathogenic for mice, it appears to have no ill effect whatever upon pigs, even when large doses are given intravenously. He therefore considers it is more closely akin to the organism of mouse septicæmia than to *E.r.* While the evidence strongly suggests that infection usually takes place either through the castration and docking wounds or through the umbilicus, M. induced the disease in lambs with cultures of the organism given by the mouth or dropped on to the eyes. Where losses are such as to warrant it, the treatment of the navel at birth with antiseptics is advocated; marking should be carried out with due regard for cleanliness and in yards temporarily erected for the purpose. In certain instances the prophylactic use of vaccine or serum may be economical.—D. A. GILL.

BOQUET, F. (1937). **Recherches expérimentales sur la pseudo-tuberculose des rongeurs.** [**Pseudotuberculosis of Rodents**].—*Ann. Inst. Pasteur.* **59**. 341-381. 7 figs., 11 tables. [Numerous refs.]

A detailed account of the morphological, cultural and pathogenic properties of *Pasteurella pseudotuberculosis rodentium*, together with a description of the clinical, epidemiological and immunological features of the disease.

Considerable space is given to the subject of dissociation, and it is stated that in view of the extreme instability of the strains it would be more appropriate to speak of them as homogeneous and agglutinable in physiological saline rather than as S and R. The biochemical, pathogenic and antigenic properties of the variants are equally distinct, the homogeneous type being more pathogenic and having a more marked action on sugars. Both variants are motile at 20°C., but non-motile at 37°C. Although without flagella at 37°C. the organisms still contain flagellar antigen, but this is greater in the homogeneous strain. In both variants flagellar antigen is more abundant when grown at 20°C.

The spread of the organisms in healthy and immune animals resembles that described following infection and superinfection with *Mycobacterium tuberculosis*. With the progress of infection an allergic state develops which is revealed by local and general reactions to sterilized liquid cultures of the organism. Avirulent strains confer a specific immunity on g. pigs.—GWILYM O. DAVIES.

I. OLT, A. (1937). Ueber das seuchenhafte Auftreten der Rodentiose unter den Hasen. [*Pasteurella pseudotuberculosis* Infection in Hares].—*Z. InfektKr. Haustiere*. **52**. 89-107. [13 refs.]

II. MORETTI, B. (1938). Ein Beitrag zur Pseudotuberkulose. [*Pseudotuberculosis*].—*Dtsch. tierärztl. Wschr.* **46**. 35-37. 1 fig., 3 tables. [12 refs.]

I. The significance of *Past. pseudotuberculosis* infection of hares and rabbits is discussed with special reference to the question of nomenclature. The macroscopic and microscopic changes produced in hares are detailed. Control of the disease is complicated by the fact that it is also a natural infection of mice and rats, so that measures must include the extermination of these pests.

II. Six strains of *Past. pseudotuberculosis* collected from different animals (hare, rabbit, nutria, pigeon and man) were examined culturally and serologically, and from these investigations it is concluded that whilst there are no cultural differences between strains, several antigenic sub-types exist. [The serological findings should only be accepted with reserve. No attempt appears to have been made to differentiate between "H" and "O" agglutination, and it seems likely that the minor differences which were noted in the tests may have been due to the presence of varying proportions of "H" and "O" antigen and antibody in the test fluids].—E. J. PULLINGER.

HART, L. (1938). The Occurrence of Fowl Cholera in Australia.—*Aust. vet. J.* **14**. 71-72. [2 refs.]

The occurrence of heavy mortality due to septicaemic *Pasteurella aviseptica* infection in fowls is recorded for the first time in Australia. Particulars of five outbreaks are given. The strains isolated were highly pathogenic for rabbits and fowls, but less so for g. pigs. They were non-pathogenic for fowls by the intra-nasal and intraocular routes, however, or when given *per os*. Subcutaneous inoculation in fowls produced local necrosis and oedema. This type of infection was recorded by SEDDON (1914) in Australia as the cause of oedema of the wattles of poultry.—D. A. GILL.

NOBREGA, P., & REIS, J. (1937). Sobre o reconhecimento de portadores na cholera aviaria e a persistencia da "pasteurella avicida" nesses animaes. [*Fowl Cholera Carriers*].—*Arch. Inst. biol. Def. agric. anim., S. Paulo*. **8**. 189-188. 1 table. [10 refs.] [English summary].

The authors emphasize the importance of healthy carriers in the epizootology of fowl cholera. The fluorescent type of *Pasteurella avicida*, which is supposed

to disappear very soon from the body, can survive 15 months in the nasal passage of fowls. The existence of carriers of this type of pasteurella explain the periodical reappearance of epizootic fowl cholera, a feature very often met with in Brazil. These findings agree with those of HUGHES and his co-workers [(1980-82). *J. exp. med.* 51. 225 and 289, and 55. 71]. Inoculation into pigeons of the mucus from the nasal passage of the fowls is the best way of demonstrating the carriers. Cultural and serological work are described.—S. TORRES.

STAFSETH, N. J. (1988). **The Whole Blood Agglutination Test for Pullorum Disease.**—*Vet. Med.* 33. 6-9. [3 refs.]

The whole-blood slide aggl. test using a stained concentrated antigen is described and S. points out a number of advantages which he thinks this test has over the tube aggl. test. He emphasizes the need for hygienic measures when controlling the disease by means of the test. The whole-blood slide aggl. test is the only one used in the state of Michigan.—L. E. HUGHES.

FRANK, N. A., & EDGINGTON, B. H. (1987). **Agglutinin Content of Eggs from Salmonella Pullorum Infected Hens.**—*Poult. Sci.* 16. 442-444. 1 table [5 refs.]

A brief survey of the literature is given. 495 eggs from hens naturally affected with pullorum disease, as indicated by the presence of agglutinins in their blood serum, were tested for the presence of similar agglutinins in the yolk and albumen. At autopsy *S.p.* was recovered from 18 of the 19 birds from which the eggs were obtained.

The yolks of 878 eggs gave complete agglutination when tested by the stained-antigen-plate method; in all cases the albumin proved negative. Of 92 eggs cultured for the presence of *S.p.*, all were negative.—L. E. HUGHES.

BARBONI, E. (1987). 'Ricerche sul primo focolaio di pullorosi nei tacchini riscontrato in Italia. [The First Cases of Pullorum Disease in Turkeys in Italy].—*Clin. vet., Milano.* 60. 597-618. 4 figs., 2 tables. [Numerous refs.]

Fifteen turkeys 5-10 days old died after an illness of 3-4 days, and a type of *Salmonella pullorum* was isolated. It was found that the eggs of infected turkeys were also infected.—HANS GRAF (ZÜRICH).

- I. KUJUMGIEFF, I. (1987). Saggi di differenziazione fra *Bacterium pullorum* (Rettger) e *Bacterium gallinarum* (Klein) per mezzo dell' agglutinazione aspecifica alla tripaflavina. [Non-Specific Agglutination with Trypaflavine for the Differentiation of *Salmonella pullorum* and *Salmonella gallinarum*].—*G. Batt. Immun.* 19. 864-870. [9 refs.] [English, French and German summaries].
  - II. SCARAPPELLINI, M. (1988). A propos du comportement des *Salmonellae Pullorum-Gallinarum* dans l'agglutination aspécifique à la tripaflavine. [Non-Specific Agglutination with Trypaflavine for the Differentiation of *S. pullorum* and *S. gallinarum*].—*Boll. Sez. ital. Soc. int. Microbiol.* 10. 44-48. 1 table. [10 refs.] [In French].
- I. K. investigated whether trypaflavine would produce a non-specific agglutination reaction that could be used for differentiation between *S.g.* and *S.p.*, fixed quantities of the trypaflavine and of a suspension of 48-hour agar culture being mixed, the tubes then being corked and shaken.
- All of five strains of *S.p.* were agglutinated, but there was no agglutination of 14 strains of *S.g.*; with one strain of *S.g.* there was a trace of agglutination.

Agglutination began between the 15th and 18th hour and was very evident from the 24th to the 30th hour.

II. The author endeavoured to confirm the work of KUJUMGIEFF. He found that 18 out of 25 strains of *S. pullorum* were not agglutinated and five out of 23 strains of *S. gallinarum* were agglutinated with trypaflavine.—D. L. HUGHES.

BEAUDETTE, F. R. (1938). **An Outbreak of Fowl Typhoid in Guineas.**—*J. Amer. vet. med. Ass.* **92**. 695-698. [13 refs.]

Describes an outbreak of fowl typhoid among young guinea-fowls in which there was a mortality of 92% within three weeks of onset of the disease in the flock, and in which respiratory symptoms were prominent. The chief P.M. lesions were enlargement and friability of the liver and spleen, congestion of the lungs, catarrhal enteritis and, in the nasal passages, a considerable amount of mucus from which *Salmonella gallinarum* was recovered in pure culture.

Details are given of the fermentation reactions exhibited by the recovered organism. B. discusses the literature dealing with the susceptibility of various species of domesticated and wild birds to fowl typhoid.—H. BURROW.

BRAGA, A. (1937). Sobre o isolamento de germes do grupo coli-typhico-dysenterico de ovos de chelonias da Amazonia, consumidos como alimentos. I. **[The Isolation of Bacteria of the Coli-Typhoid-Dysentery Group from Tortoise Eggs Eaten as Food in the Amazon District. I].**—*Bol. Soc. brasil. Med. vet.* **7**. 453-459. [Numerous refs.]

*Bact. coli communis*, *Bact. leporis*, *Bact. equirulis* and "*Eberthella enterica*" were isolated from tortoise eggs eaten by natives in the Amazon basin. B. considers the epidemiological importance of these findings in relation to tropical pathology.

—S. TORRES.

I. KERR, W. R. (1938). **Bovine Contagious Abortion. Part I. Experiments with a New Type of Dead Vaccine.**—*Vet. Rec.* **50**. 717-726. 22 figs., 3 tables.

II. COMMON, R. H., & KERR, W. R. (1938). **Bovine Contagious Abortion. Part II. The Relationship between Plasma Proteins and Agglutination Titre.**—*Ibid.* 727-730. 2 tables. [8 refs.]

I. An attempt was made to produce a medium reminiscent of that used for the tubercle bacillus by SPAHLINGER [*V. B.* **6**. 14.]; it was hoped that such a medium would yield a bacterial growth that after suitable treatment would possess a good antigenic power. Normal uterine fluid was sterilized by filtration, sown with culture and incubated. The culture was then maintained in the incubator for 8-12 months until the organisms were dead. It was tested on male g. pigs which were vaccinated and later infected with *Brucella abortus* by instillation of the infecting dose on to the conjunctiva.

The degree of infection resulting was judged by the relative increase in size and weight of the spleen, by the development of purulent orchitis, and by the presence of abscesses in the liver. Results showed that according to the criteria laid down, the vaccine conferred a partial immunity on the g. pigs.

Further experiments were carried out on heifers with negative blood agglutination reactions. These were vaccinated and exposed to heavy natural infection from discharge of aborted cows and also from contact with infected cows. Unvaccinated control heifers were exposed to the same infection. Results showed only a partial immunity in the vaccinated group.

A low and delayed aggl. titre developed in the control animals, which subsequently aborted, while the vaccinated animals showed a prompt and definite

aggl. response to infection. This is considered to suggest that a low aggl. titre may indicate an animal potentially more dangerous than one giving a high titre. Calves of the herd born prematurely gave negative aggl. reactions at birth, but became positive after one week and remained so, on an average, for six weeks. *Br.a.* was recovered from 90% of milk samples from both vaccinated and control animals, and from uterine discharge from cows of both groups.

II. A rise in globulin and corresponding fall in albumin was noted in the blood sera of the vaccinated heifers mentioned in I. This rise was also noted when abortion occurred following massive natural infection. This may be explained as either a normal accompaniment of parturition or as arising directly from the presence of antibodies excited by *Br.a.*: the precise explanation has still to be decided. Reference is made to the technique of assessment of serum-globulin and to the albumin : globulin ratio.—H. BURROW.

BUTOZAN, V. (1938). Početna istraživanja Bangove bolesti goveda u nekim središtima Vrbaske banovine. [*Bovine Brucellosis in the Vrbas Province in Yugoslavia*].—*Jugoslav. vet. Glasn.* 18. 140-143. 2 tables. [7 refs.]

B. examined 328 cows for brucellosis in the Vrbas Province of Bosnia, Yugoslavia. Blood serum agglutination tests were considered as positive at a titre of 1 : 200, and samples of whey at 1 : 40. With these criteria blood serum samples were positive in 11 cases (3.4%). Blood samples taken from 31 cows which had aborted gave positive results in 22 cases. In only one out of the 31 cases was B. able to isolate *Br. abortus*, and similarly the organism could only be isolated from one of the fetuses. [No details given].—B. OSWALD (KRIŽEVCI).

HOLTH, H. (1938). Oversikt over de diagnostiske undersøkelser i anledning den smittsomme kastning, foretatt ved Veterinærinstituttet i 1937. [*Results of Diagnostic Work on Bovine Brucellosis at the Veterinary Institute, Oslo, in 1937*].—*Norsk VetTidsskr.* 50. 158-169. 4 tables. [English and German summaries].

During the year 1937, 32,948 blood samples from cows were tested (as against 74,477 in 1936), in the majority of cases by the agglutination test, the complement-fixation test being applied merely for confirmation, and in comparatively few cases; 1,427 (4.3%) gave positive reactions, 103 (0.3%) were doubtful, and 31,418 (95.4%) were negative. Of 1,487 samples from cows bought in the market, six reacted positively and two gave doubtful reactions. The placentas from two heifers were infected. As several herds were examined more than once, the figures quoted do not show either the actual number of cows tested or the exact number of positive reactors.

The blood samples were derived from a total of 5,005 herds (as against 7,198 in 1936) positive reactors were found in 161 and suspicious cases in three.

Of 3,361 abortions recorded in cattle, 291 (8.9%) were found to be due to brucella infection, as against 14% in 1936. The progress of the control work is considered satisfactory.

Blood samples from six horses, 211 goats, two sows, one fox and one human being were also tested, and positive reactions were obtained in five of the goats and in the human case.

A point demanding serious consideration, in H's opinion, is the fact that brucella infection in the cow may be latent for some time and that such an animal may yield a negative reaction to the aggl. test, and then eventually become a reactor.

—GUSTAV NAERLAND (OSLO).

THORSHAUG, N. (1937). La lutte contre l'avortement épizootique des bovidés en Norvège. [**Control of Bovine Contagious Abortion in Norway**].—*Bull. Off. int. Hyg. publ.* **29**. 956-962. 1 table, 1 chart.

Although efforts have been made in Norway to combat this disease for 30 years, it is only since 1934 that systematic methods have been employed to eradicate it. One of the greatest difficulties, however, is that many cattle owners have only a vague idea of the importance of this disease.

The measures which have been put into force by the State have two main objects, *viz.*, to prevent spread of infection from herd to herd, and to eradicate the disease in particular herds. The latter is supported by State grants, but is optional and is only carried out in certain herds. Although these measures have only been applied for about two years, considerable improvement is noted. The disease has been eradicated from 62% of infected herds and it is expected that a further 28% will be free in a short time. Less than 10% of herds remain to be dealt with.

—GWILYM O. DAVIES.

VERŠILOVA, P., & ŠTRITER, V. (1937). Opyt izučeniya immuniteta pri brucelleze u ovec s pomoščju metoda superinfekcii. [**A Study of Resistance to Brucellosis in Sheep Subjected to Superinfection**].—*Brucellosis in Sheep*. pp. 339-349. 2 tables. Moscow: Viem Publ. Dept.

Sixty-four healthy sheep were artificially infected with a virulent strain of *Br. melitensis* ( $10^5$  to  $10^9$  organisms), and then given superimposed infections with the same strain at intervals of from three months to two years. It is stated that when cultures were prepared three months and also two years later, no growths occurred. The doses used for the superimposed infections were in most cases  $10^6$  bacilli in the earlier experiments, and  $10^5$  in the later experiments, and were 20-200 times the minimum infective dose; in control animals these doses were sufficient to establish a generalized infection of the internal organs. Bacteriological examination of sheep, which were slaughtered 15 days after superimposed infection, indicated that the primary infection tended to increase the resistance of the animals to superinfection over a period ranging from three months to two years, since in the majority of cases the brucella were either completely irrecoverable or else present only in the lymph nodes nearest the point of inoculation. In only two of the 54 sheep tested with the above-mentioned doses were the brucella found generalized throughout the internal organs.

This acquired resistance varied considerably from one animal to another, and showed a tendency to decrease in the period after the primary infection. It was also broken down by reinoculation with massive doses (of the order of 2,000 times the minimum infective dose) of the virulent strain. Nevertheless, the results were considered sufficiently encouraging to warrant a further search for a method of prophylactic vaccination.

The authors claim that in superinfection there is a method for determining whether a sheep is or has been infected; normal susceptibility would, it is said, indicate absence of previous infection, whereas heightened resistance would indicate past infection.

SANTAGOSTINO, C. (1937). Considerazioni sull'epidemiologia di alcuni casi di febbre ondulante. [**Epidemiology of Undulant Fever**].—*Clin. vet., Milano*. **60**. 139-146. [17 refs.]

S. states that since 1924, when the campaign for the control of brucella abortion in domestic animals was initiated at the Stazione Zooprofilattico di Milano, not a single case of human infection has been recorded from the use of the live vaccine

prepared there, although no less than 100,000 ampoules of the vaccine have been issued. He attributes this fact chiefly to the precautions taken to ensure that the culture used for the vaccine is derived from cattle known never to have been in contact with sheep; *Br. melitensis* carried by the latter is highly infectious to man, but it is stated that no case of human *Br. abortus* infection has been recorded in Lombardy. S. states that in preparing the vaccine the bovine strain should not be passed through g. pigs, owing to the possibility of these animals being already infected with *Br. melitensis*.

CORDIER, G. (1938). Effets des inoculations de certaines souches de Brucella avec ou sans excipient irrésorbables chez diverses espèces animales. [**Effect of Inoculating Certain Brucella Strains, with or without an Unabsorbable Excipient, in some Domestic Animals**].—*Rev. Méd. vét., Toulouse*. 90. 481-508. 5 tables. [4 refs.]

The results of injections of broth cultures of an avirulent bovine strain of *Br. abortus*, both alone and suspended in vaseline-lanoline mixtures is compared in two groups of 20 g. pigs. Tables indicate size of local reaction and agglutinating titres at given intervals after injection. In no case was *Br.a.* recovered at autopsy.

Similar data and results of allergic tests with "brucellere" (a commercial preparation) are tabulated for 12 ewes injected with a vaseline-lanoline suspension and eight [? six] with broth culture. Inoculation of 200 guinea pigs with blood and milk taken at intervals from these ewes gave negative results, and none of the ewes aborted. The same results were obtained in 18 ewes and nine cows with vaseline-lanoline suspensions of the same strain of *Br.a.* and of a strain of *Br. suis*.

Repeated injections at half-yearly or yearly intervals did not affect gestation. Field strains gave results similar to those obtained with the two brucella strains.

—R. O. MUIR.

VELU, H., & ZOTTNER, G. (1938). Stérilisation des germes dans les vaccins antibrucelliques lanolines. [**Sterilization of the Bacilli in Brucella Lanoline Vaccines**].—*C. R. Soc. Biol. Paris*. 129. 749-751. [3 refs.]

Three bovine strains of *Br. abortus* from centrifuged 48-hour cultures growing well on ordinary media were suspended in 50%, 20% and 10% of lanoline respectively, and sub-cultured at intervals in broth and on agar during storage in the dark at room temperature. The mixtures proved sterile after eight hours, five days and 12 days respectively.—R. O. MUIR.

VALLE, A. L., BRAGA, A., & WEY, A. (1938). Epizootia mortifera em patos novos, devida a *Alcaligenes Faecalis*. [**Deaths in Young Ducks, Due to Infection by Bacterium alcaligenes**].—*Bol. Soc. brasil. Med. vet.* 8. 15-18. [4 refs.] [French summary].

The authors describe an epizootic disease, in ducks two to three weeks old, characterized by diarrhoea, weakness and death in 24 hours. The mortality was about 100%. Older ducks were not affected. The lesions were those of a septicaemic disease. Blood culture showed a motile Gram-negative bacillus that was identified as *Bact. alcaligenes*. [The authors say nothing about any experimental reproduction of the disease].—S. TORRES.

HUBER, F. L., & KRANEVELD, F. C. (1937-1938). Anaërobie bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XXI. Vergelijkende proeven met boutvuurserum. XXII. Het voorkomen van antistoffen tegen boutvuur en paraboutvuur in het serum van normale

runderen en paarden. [Anaerobic Diseases of Animals in the Dutch East Indies. XXI. Tests of Blackleg Serum. XXII. Antibodies against Blackleg and Malignant Oedema in the Serum of Normal Cattle and Horses].—*Ned.-ind. Bl. Diergeneesk.* 49. 349-359, and 50. 60-78. 10 tables, 2 graphs. [8 refs.] [English and German summaries].

KRANEVELD, F. C., & DJAENOEDIN, R. (1938). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XXIII. De diagnostiek van boutvuur. [Anaerobic Diseases of Domestic Animals in the Dutch East Indies. XXIII. Diagnosis of Blackleg].—*Ibid.* 115-130. 6 tables. [English and German summaries].

XXI. The duration of passive immunity after injection of blackleg serum was found to be short in guinea pigs, but was still demonstrable in sheep up to the 14th day. A serum of high potency was obtained when cattle were treated either with culture filtrate, blackleg culture or blackleg muscle powder.

XXII. In immunization experiments on g. pigs, no evidence was found of cross-immunity between *Clostridium chauvoei* and *Cl. septicum*, but in cattle and horses so treated there was such cross-immunity. Blackleg serum sometimes protected against *Cl. septicum* and *vice versa*. It was shown, however, that sera of normal animals had a protective action against these organisms. The experiments, therefore, only indicate the presence of a common component to a limited extent in *Cl. chauvoei* and *Cl. septicum*.

XXIII. In the Dutch East Indies the best way of sending blackleg material to the laboratories was found to be in the form of dried muscle, or of fresh muscle packed in sterile salt. Examination is made by cultivation on glucose-blood agar Zeissler plates and by direct inoculation of g. pigs. In the case of a negative result it is advisable to inoculate g. pigs with liver-broth culture. The g. pig inoculations give better results than the cultural tests. Of the cultural methods, direct cultivation on Zeissler plates is the quickest and the most reliable.

—JAC. JANSEN (UTRECHT).

McCoy, Elizabeth, & McCLUNG, L. S. (1938). Serological Relations among Spore-Forming Anaerobic Bacteria.—*Bact. Revs.* 2. 47-97. [Num. refs.]

A comprehensive review of the efforts which have been made to classify the *Clostridium* genus serologically, the discussion being confined to the value of results rather than to any consideration of the technical methods applied. Whilst the genus as a whole cannot be classified serologically, these methods serve to sub-divide closely related types, and thus the toxin-antitoxin differentiation of *Cl. chauvoei* and *Cl. septicum*, or of the types of *Cl. welchii*, is of unquestionable value. All attempts to classify *Cl.w.* by agglutination have failed, and the subdivision of strains of *Cl. tetani* according to "H" antigen seems to serve no useful purpose; on the other hand the "O" antigen of *Cl.t.* may have taxonomic significance, whilst "O" antigen also serves to relate *botulinus* and *parabotulinus* strains.—E. J. PULLINGER.

MILOVZOROV, E. P., & TCHASOVNIKOV, N. (1933). Opyty immunizacii prui infekcionnom mastite ovec. [Immunization Experiments in Connexion with Infectious Mastitis of Sheep].—*Sovyet. Vet.* No. 11. pp. 34-37. 1 table.

Two series of experiments were conducted on the immunizing effect of formalin-killed vaccines against "*B. mastitis ovis*". Nine sheep were given two

subcutaneous doses, at eight days' interval, of formalin-killed agar culture suspension ( $5 \times 10^9$  organisms for the first, and  $10^{10}$  for the second dose). They were infected [method not stated] a month later, together with two unvaccinated controls. In the latter acute mastitis developed, with subsequent loss of function of the infected half of the udder, whereas in the vaccinated animals only oedema was produced, which disappeared in 4-5 days. A similar small scale experiment was repeated the following year, with comparable results.

Vaccination as a prophylactic measure was then studied under natural conditions on 4,197 sheep. Mastitis after lambing had been fairly widespread and serious in the flocks in previous years, and had already appeared before vaccination commenced. The vaccine used was prepared from broth cultures of four strains freshly obtained from the farm. They were incubated for 48 hours and killed with 0.13% formalin (24 hours in incubator).

Three vaccinations were performed at 8-10 days' interval with 2 c.c., 8 c.c. and 4 c.c. respectively.

It was not possible to keep controls, but the authors considered the results to be significant in comparison with the incidence and virulence of the disease in the same flocks before vaccination.

KLIENEBERGER, Emmy. (1988). **Pleuropneumonia-Like Organisms of Diverse Provenance: Some Results of an Enquiry into Methods of Differentiation.**—*J. Hyg., Camb.* 38. 458-476. 8 text figs., 14 figs. on 2 plates, 7 tables. [19 refs.]

A number of pleuro-pneumonia-like organisms were studied in respect of cultural and serological reactions with a view to their classification. In addition to the organisms of contagious bovine pleuro-pneumonia and contagious agalactia, strains were isolated from cultures of *Streptobacillus moniliformis* from lung lesions in rats and from the lungs of dogs stated to be affected with distemper. By comparing morphological appearances, average colony size and structure, and the appearance of "granular" and coarse" colonies after three days incubation on solid medium, a preliminary grouping was achieved.

The serological differences were detected by preparing agglutinating sera in rabbits. The results of cross-agglutination tests showed that the 16 strains examined fell into 7 distinct sub-groups. Thus, the organisms occurring in symbiosis with *Str.m.* represented one group, the pleuro-pneumonia strains fell into a second, and so on. The organisms isolated from the lung lesions in rats were pathogenic for mice.

Details of the experiments should be consulted in the original by those interested.—R. E. GLOVER.

AJELLO, P. (1987). Ricerche batteriologiche sull'utero della cagna. [**Bacteriological Tests on the Uteri of Bitches**].—*Clin. vet., Milano.* 60. 614-626. 1 table. [Numerous refs.]

A. gives details of the examination of the uteri removed surgically from 52 bitches, and tabulates the results. The animals were not in whelp, and 46 of the uteri appeared quite normal on macroscopic inspection. In 37 cases the contents of the uterus were sterile, and in 15 cases bacteria were present. *Brucella melitensis* was isolated from one. In the majority of cases the bacteria discovered were scanty and of little or no pathogenicity. He discusses the importance of the non-pathogenic bacteria found and suggests that in certain circumstances they might become pathogenic. He also discusses the path of entry into the uterus and suggests that the organisms were introduced at coitus.—S. F. J. HODGMAN.

LANGERON, M., & GUERRA, P. (1938). Nouvelles recherches de zymologie médicale. [**Medical Mycology**].—*Ann. Parasit. hum. comp.* **16**. 86-84 and 162-179. 1 table. [Numerous refs.]

The authors criticize the confusing nomenclature adopted for the lowest fungi—the yeasts and pseudo-yeasts—and claim that the 200 pathogenic fungi included in the genera *Monilia*, *Cryptococcus*, *Saccharomyces*, *Endomyces* and *Debaromyces*, could be reduced to about 20 valid species. After detailing cultural methods for isolation and purification, they describe the principal growth characters on solid and in liquid media. Microscopic technique and fermentation tests are given, with a critical examination of their value. A synthetic medium is described with ethyl alcohol as the sole source of carbon. Sugar fermentation and nitrogen assimilation are next considered, with a description of the auxanographic method of study. The authors have applied these methods of study in classifying the Mycotoruloideae parasitic in man and animals.

The genus *Parendomyces*, diagnosed by its characteristic chlamydospores, corresponds with *Candida albicans*, the name in their new classification. The type species and several others of the genus *Castellania* are classified by sugar fermentation as either *Candida tropicalis* or *Candida guilliermondi*. Several species of the genus *Parasaccharomyces* automatically fall into four species of *Candida*. The genera *Syringospora*, *Blastodendron*, *Mycotoruloides*, *Mycocandida*, *Pseudomonilia*, *Schizoblastosporion* and *Pseudomycoderma* are distributed amongst nine species of *Candida*.

The Mycotoruloideae are defined as anascosporous pseudo-yeasts (as opposed to the ascosporous yeasts), which are habitual parasites of mammals, characterized by a pseudomycelium of blastospores with an imperfect type of sporulation. They are united in a single genus, *Candida*, which is divided into 17 species according to carbohydrate fermentation.—R. O. MUIR.

MUENDE, I., & WEBB, P. (1937). **Ringworm Fungus Growing as a Saprophyte under Natural Conditions**.—*Arch. Derm., Chicago*. **36**. 987-990. 2 figs. [Copied verbatim from *Rev. appl. Mycol.* **17**. 245].

In April, 1936, the writers visited a farm near Oxford, England, to investigate a severe outbreak of ringworm among calves kept in stone-walled sheds with wooden partitions and feeding-troughs. Cultures obtained from the hair and scales of the animals were identified as *T. gypseum asteroides* [*T. mentagrophytes*]. Three months later a comprehensive collection of fungi was made in the same sheds, and one of the 47 specimens collected was identical with that obtained from the calves. Experimental inoculations showed it to be pathogenic to g. pigs. Fourteen healthy calves confined in the sheds during the following October also contracted the disease. This is believed to be the first record of a ringworm fungus growing as a saprophyte in nature.

## DISEASES CAUSED BY PROTOZOAN PARASITES

HOARE, C. A. (1938). **Morphological and Taxonomic Studies on Mammalian Trypanosomes. V. The Diagnostic Value of the Kinetoplast**.—*Trans. R. Soc. trop. Med. Hyg.* **32**. 833-342. 12 figs., 1 table. [11 refs.] [See also *V. B.* **9**. 12].

The term "kinetoplast" in this paper is used to denote the kintonucleus or parabasal body alone, and not the complex of this organ and the blepharoplast. It is pointed out that the kinetoplastic characters alone afford no criteria for the

diagnosis of species, but they have a supplementary value for the differentiation of certain groups, particularly when a diagnosis has to be made on examination of a small number of organisms in a poorly stained smear.

Specimens of 14 different species of trypanosomes were examined and the kinetoplastic characters classified in respect of size, shape and position. In regard to shape, it is pointed out that the kinetoplast may appear as round, oval or rod-shaped, but these variations may largely depend on the aspect which is viewed microscopically, though it seems that the aspect which is usually seen may depend to some extent on the species. The various positions of the kinetoplast are described as terminal, subterminal, marginal and subcentral, this last implying that the organ is situated near, and posterior to, the nucleus.

In the *lewisi* group, the kinetoplast is large ( $1.1-1.4\mu$ ), rounded, and subterminal or subcentral, except in *Tryp. melophagium* in which it is oval or rod-shaped and subcentral.

In the *vivax* group, it is large ( $1.1\mu$ ), always rounded, terminal or subterminal, and occasionally marginal. In the *congolense* group, it is of medium size ( $0.7$  to  $0.8\mu$ ), rounded or rod-shaped, and in the great majority of individuals subterminal and marginal. In the *brucei* and *evansi* groups it is small ( $0.6\mu$ ), usually rod-shaped, in the majority of cases subterminal, and occasionally marginal.

Discussing Jacono's modification of Chalmer's system of classification based on the position of the kinetoplast, H. points out that *Tryp. melophagium* would be placed in the genus *Trypanosoma*, owing to its subcentral kinetoplast, whilst the majority of the *Tryp. lewisi* group would be placed in the genus *Castellanella*, although *Tryp. melophagium* possesses all the other characteristics—morphological and biological—of the *lewisi* group.—U. F. RICHARDSON.

- I. VAN HOOF, L., HENRARD, C., & PEEL, E. (1937). Action de repas médicamenteux sur l'évolution des trypanosomes pathogènes chez la "*Glossina palpalis*". [**The Action of a Medicated Feed on the Development of Pathogenic Trypanosomes in *G.p.***].—*Ann. Soc. belge Méd. trop.* 17. 385-440. Numerous tables. [Numerous refs.]
- II. VAN HOOF, L., HENRARD, C., & PEEL, E. (1937). L'infection proventriculaire permet-elle de pronostiquer à coup sûr l'invasion ultérieure des glandes salivaires de "*Glossina palpalis*" par "*Trypanosoma gambiense*"? [**Is Proventricular Infection of *G.p.* with *Tryp. gambiense* always Followed by Infection of the Salivary Glands?**].—*Ibid.* 441-459. 1 table. [12 refs.]
- I. Tsetse flies infected with *Tryp. gambiense* were allowed to feed on animals treated with tryparsamide, germanin, neosalvarsan and Bayer 411 (an antimony compound) at a time when the drugs would be exerting their greatest trypanocidal action in the blood (*e.g.*, in the case of tryparsamide eight hours after injection). In the case of *Tryp. gambiense* this medication of the feed appeared to have no action on the trypanosomes in the fly in either the gut, the proventriculus or the salivary glands.

Some flies, however, in which living trypanosomes were found in the salivary glands on dissection had failed to infect animals by their bite. When infection by the bite was produced there was no prolongation of the incubation period. A preliminary feed on blood from an animal treated with any of the drugs failed to prevent the infection of flies at later feeds. Feeds of medicated blood given repeatedly during the period of development of trypanosomes in the flies failed to prevent the flies from becoming infective in all cases, but appeared to reduce the number of flies in which trypanosomes developed.

The results with *Tryp. brucei* were similar to those with *Tryp. gambiense*,

but none of the drugs appeared to have any influence on the development of *Tryp. congolense*. In the case of *Tryp. vivax*, germanin appeared to have both a disinfectant and inhibitory action, the infection percentage in tsetse which had been fed, after infection, on the blood of treated animals being half that of flies which had been fed, after infection, on healthy animals.

II. Working with a non-transmissible strain of *Tryp. gambiense*, a feebly transmissible strain, and a readily transmissible strain, the authors detected a few proventricular infections in *G.p.* but no salivary gland infections with the first, numerous proventricular infections but few salivary infections with the second, and relatively numerous infections of both sites with the third. Discussing whether salivary gland infection may occur direct, they point out that gut and proventricular infections may be very scanty, and may even die out, and thus be overlooked. They also point out that if direct gland infection occurred, the time required for cyclical development in *G.p.* should be shorter, as it is in the case of *Tryp. vivax*. Discussing whether proventricular infection is an essential step to invasion of the salivary glands, they point out that the long trypanosome forms which are believed to be responsible for the anterior migration do occur in the gut and may be able to migrate from there to the salivary glands. They consider, however, that proventricular development is a normal stage in glandular invasion even if it is not essential.—U. F. RICHARDSON.

VAN HOOFF, L., HENRARD, C., & PEEL, L. (1937). Influence de repas préliminaires indifférents sur l'évolution de *Trypanosoma cazalhoui* chez *Glossina palpalis*. [Influence of Preliminary Feeds on the Development of *Tryp. vivax* (*cazalhoui*) in *G.p.*].—*C. R. Soc. Biol. Paris*. 126. 1249-1252. [4 refs.]

Two hundred *G.p.* were allowed to feed on a goat. *Tryp. vivax* (*cazalhoui*) and *Tryp. congolense* appeared in the blood 14 days later and the goat died of the mixed infection 23 days after the first infection. Three lots of newly hatched flies were allowed to feed on a hen, a monkey and a g. pig (all uninfected) and then twice on the infected goat. Two other lots which served as controls were fed on the goat only. After each feed the flies were examined one by one and those which were not obviously engorged were no longer used. Of the glossina dissected and examined 28 days after feeding on the goat, 48.9% were infected with *Tryp. vivax*, and 45.8% of the controls were infected. It is concluded that a preliminary blood meal on a non-infected host has no influence on the development of infection when the flies have a subsequent feed on an infected host.

SLATINEAU, A., BALMUS, G., & BALMUS, P. (1937). Sur une épizootie due au trypanosome *Lewisi*-Kent. [An Epizootic of *Tryp. lewisi* Infection].—*Arch. roum. Path. exp. Microbiol.* 10. 159-170. 6 figs., on 6 plates. [Numerous refs.] [In French].

*Tryp. lewisi*, recorded by many workers as a saprophyte of rats, has nevertheless been proved on certain occasions to have been responsible for sudden epizootics, with a high mortality among laboratory rats. After one of these outbreaks, in which only certain cages were affected, the authors experimented with four naturally infected white rats and two others artificially infected with blood from these four. All the rats died, four out of the six with marked anaemia. Macroscopical and microscopical lesions of the liver, spleen, kidneys, lungs and central nervous system are described in detail.

In the epizootic the parasite had evidently been transmitted by fleas from sewer rats in the laboratory, in which animals it was avirulent; the white rats, however, were apparently less resistant.

EULER. (1937). Die Auswirkungen und Bekämpfung der Geschlechtstrichomonaden in einer grossen ostpreussischen Rinderherde. [**The Control of Bovine Trichomoniasis in East Prussia**].—*Z. InfektKr. Haustiere*. 51. 208-214. 2 tables, 2 graphs. [8 refs.]

A description of an outbreak of trichomoniasis in a herd of about 160 cattle in East Prussia. In 1936, 22% of pregnancies ended in abortion, but after uterine irrigation with an aqueous solution of iodine the infection was almost completely eradicated in 1937. Various other treatments were also used, but were dropped in favour of iodine.

Tests for brucellosis were mostly negative in the animals concerned.—J. E.

STABLER, R. M. (1938). **The Similarity between the Flagellate of Turkey Trichomoniasis and *T. Columbæ* in the Pigeon**.—*J. Amer. vet. med. Ass.* 93. 33-34. 1 fig. [2 refs.]

S. passed *Tr.c.* to a turkey by smearing its mouth with material from an affected pigeon, without causing apparent illness. A week later, cultures were made from this turkey and passaged to another turkey, which became very ill for two weeks and yielded cultures which were fed to a healthy pigeon and caused disease identical with that in the first pigeon. The turkeys remained infected for 61 and 54 days respectively.

S. considers that *Tr. diversa*, previously reported as the cause of trichomoniasis of the crop of turkeys, is synonymous with *Tr. columbæ*. The drawing of the parasites isolated from these two hosts supports this conclusion.—C. V. WATKINS.

VINATZER, J. (1938). Zur Züchtung der Rindertrichomonaden in sterilisierbaren Nährmedien. [**Culture of Bovine Trichomonads on Sterilizable Media**].—*Wien. tierärztl. Mschr.* 25. 543-544.

V. obtained good growth of bovine trichomonads in broth containing small pieces (of the size of a pea) of the following bovine organs or tissues, and autoclaved on three consecutive days:—mucous membrane of the mouth and oesophagus, parotid gland, tracheal cartilage, tendon, bone-marrow, adipose tissue, preputial mucous membrane, corpus luteum, or pieces of blood clot. Good results were also obtained by the inclusion in the broth of hen egg yolk. The addition of 1 drop of defibrinated bovine blood to 5 c.c. broth gave better growth of the trichomonads than did larger amounts.

BARRETTO, J. F., & DE ALMEIDA, J. L. (1937). Primeiras observações sobre a presença de *Isospora felis* Wenyon, 1923 (Protozoa - Eimeridia) em felídeos no Brasil. [**The First Observation of *I.f.* in Cats in Brazil**].—*Bol. Soc. brasil. Med. vet.* 7. 357-360. 3 figs. [17 refs.]

Two cases of *I.f.* infection were observed in domestic cats in Brazil; the same organism was also isolated from the faeces of *Felis onca* L.—S. TORRES.

RAY, J. D. (1937). **Swine Balantidiasis**.—*Vet. Med.* 32. 892-896. 1 photograph. [19 refs.]

A general account of the condition.—HUGH N. SPEARS.

HEWITT, R. (1938). **The Cultivation of *Plasmodium cathemerium* for One Asexual Generation on Inspissated Egg and Rabbit Serum**.—*Amer. J. Hyg.* 27. 841-844. [8 refs.]

Tubes of slanted inspissated egg covered with 0.9% saline containing 0.5% dextrose and 5% rabbit serum were inoculated with 4-5 drops of blood from a

canary heavily infected with *Pl.c.* The tubes were inoculated in a sloping position at 37°C. Schizogony took place in about 36 hours in culture as compared with 14 hours in the living control birds.—J. E. WILSON.

- I. SABIN, A. B., & OLITSKY, P. K. (1937). *Toxoplasma and Obligate Intracellular Parasitism*.—*Science*. **85**. 836-838. [2 refs.]
- II. ANON. (1937). *Toxoplasma and Problems of Immunity*.—*Brit. med. J.* August 14th. 326-327. [10 refs.]

I. The authors accidentally isolated toxoplasms from two experimental mice. They showed that multiplication was only possible in the presence of living susceptible tissue; the organisms were cultivated on Li-Rivers medium and during the course of the work they increased in virulence. Details of the experimental infection in mice, g. pigs, rabbits and rhesus monkeys are given; in all except the last the infection was fatal. Toxoplasms appear to have characteristics common to other obligate cellular parasites such as the viruses.

Rhesus monkeys recovered from toxoplasma infection were immune to reinoculation, and their serum contained neutralizing or protective antibodies. It was found possible to titrate such sera by means of intradermal tests on rabbits. Serum from recovered rhesus monkeys, when mixed with virulent toxoplasms, protected mice and rabbits, but when the toxoplasms present were washed free of serum they retained their infectivity; the serum appeared to have no effect on the toxoplasms *in vitro*.

Before the change in virulence, rabbits recovered from an infection given intradermally, and such recovered rabbits possessed a solid immunity although having no demonstrable circulating antibodies. The authors assume that these animals had acquired a tissue immunity to the toxoplasms.

II. Toxoplasmas are parasites of experimental animals encountered as complications in transmission experiments. There are occasional reports that these organisms cause disease in man. They are small, oval, nucleated intracellular parasites, protozoan in type. Their occurrence has been recorded in many species of birds, and in the rabbit and the African gandi, in addition to laboratory animals. Commenting on the work and conclusions of SABIN [*V. B.* **5**. 688.] and of SABIN and OLITSKY [in I, above] that immunity to infections caused by obligate cellular parasites such as the viruses and toxoplasms is in the nature of a tissue resistance, and that the mechanism of such an immunity differs fundamentally from immunity to bacterial infections, it is suggested that failure to demonstrate circulating neutralizing antibodies is not sufficient evidence for assuming a tissue immunity. Failure to demonstrate a union of virus and neutralizing antibody may be due to an incorrect proportion of antigen and antibody.—L. E. HUGHES.

PITTALUGA, G. (1938). Les infections à "Bartonella". [*Bartonella Infections*].—*Bull. Inst. Pasteur*. **36**. 961-979. 1 table. [Numerous refs.]

P. discusses the species of *Bartonella* and considers that *B. bacilliformis* of man, *B. muris*, *B. canis* and *B. bovis* should be recognized. The human and canine species show marked pleomorphism. He also discusses the relationship of the *Bartonella* with *Anaplasma*, *Eperythrozoon* and *Rickettsia*, and the association of the different organisms in the same host. Filtration of bartonella has never been accomplished. For cultivation Noguchi's medium for leptospira is recommended, the optimum temperature being 25°-28°C.

In animals and human beings bartonella infections are characterized by anaemia and internal haemorrhages. Recovery leads to an immunity in which it appears that the parasites persist, and the immunity may be overcome by splenectomy,

though no relapse occurs when splenectomy is done on monkeys recovered from infection with *B. bacilliformis*. Infection with the causal organisms of other conditions, such as trypanosomes, salmonella or leptospira will also lead to relapse. The human infection appears to be transmitted by *Phlebotomus*, and the animal infections by lice of the genus *Haematopinus*.—U. F. RICHARDSON.

DELPY, L., & RAFIZA, A. (1938). Sur la morphologie, l'évolution et la différenciation d'*Eperythrozoon Wenyoni* (Adler, 1934). [**Morphology, Development and Identification of *E.w.***].—*Bull. Acad. vét. Fr.* 11. 203-208.

The authors studied the development of *E.w.* in experimentally and naturally infected cattle both before and after splenectomy. The infection may be observed in two forms, "epicorpuscular annular" and "plasmatic filamentous" forms. The annular type develops on the red corpuscles in the form of either rings or rackets, and is coloured a pale violet by Giemsa's stain. Multiplication on the annular type is in ring form and is apparently by division into two. The organisms also multiply, though less actively, in the plasma. The filamentous or plasma form arises from the preliminary annular types and, in dividing, one or more thickenings are observed. These extend into threads until a great variety of shapes occur. Secondary thickenings appear on the filaments, and become rings which themselves give rise to further filaments. These forms may adhere to the red corpuscles. Theileria, anaplasms, eperythrozoon and bartonella are often observed in the same blood film. The bartonella stain a reddish violet in contrast to the pale violet of eperythrozoon. Certain stages of the latter may resemble anaplasms and it may be differentiated from them by its disappearance from the blood after an injection of zothelone, the anaplasms remaining unaffected. [Figures mentioned in the text are omitted, and thus much of the value of the paper is lost].—S. J. G.

DE KOCK, G. (1937). Theileriose des Rindes und Affenmalaria. Vergleichende Untersuchungen mit besonderer Berücksichtigung des lymphatischen Systems. (Vorläufige Mitteilung). [**A Comparison of Theileriasis of Cattle and Monkey Malaria with Particular Reference to the Lymphatic System**].—*Arch. Schiffs- u. Tropenhyg.* 41. 581-598. 2 figs., 1 table. [Num. refs.]

The author compared the alterations produced in the lymphatic system of cattle by *Theileria mutans* with those occurring in monkey malaria as seen in material supplied by the Institute for Tropical Diseases, Hamburg. He gives a brief account of the position in South Africa with regard to theilerial infections of cattle, and sketches the recently obtained evidence that in certain circumstances *Th.m.* may cause a serious disease of cattle indistinguishable from that caused by *Th. parva*. He discusses the histological structure of lymph nodes and the lymph follicles of the spleen in affected animals, and the relationship between the cells of the reticulum and the various types of lymphocytes.

In both monkey malaria and theilerial infections of cattle the lymph follicles of the spleen showed considerable variation in size, but in many instances the size was reduced in the case of both the follicles and the secondary follicles, and in some instances the latter might be absent. The limitation of the follicles became irregular and they might be described as "fraying out" into the pulp. In the centres of the follicles phagocytosis was not observed, and the extent of mitosis was variable, the amount of reticulum being considerable and the lymphatic cells scanty. In the peripheral zone the medium-sized lymphocytes predominated, mitosis was common and macrophages occurred. The most marked change was the appearance of a homogeneous material, which was scanty in early cases of theilerial infection and in monkey malaria, but which in advanced cases of *Th.m.*

infection occupied the whole centre of the follicle and led to its destruction. The appearance of this substance was associated with degeneration of the reticulum cells. In early theilerial infections the schizonts of the parasites invaded the medium-sized lymphocytes, but in advanced cases medium and small lymphocytes were scanty and the lymphoblasts were invaded. The changes in lymph nodes were similar to those of the spleen follicles and occurred in both diseases. Accumulation of lymphatic cells occurred in the capillaries of the liver in both diseases, but similar accumulations in the kidneys only occurred in the theilerial infection.

The author discusses the function of lymphatic follicles and reviews the evidence suggesting that the secondary follicles may be the centre of the defence mechanism against toxins.—U. F. RICHARDSON.

TANGUY, Y. (1937). La piroplasmose du singe. [**Piroplasmosis in the Monkey**]. —*Ann. Inst. Pasteur*. **59**. 610-623. 33 figs. [7 refs.]

Piroplasms were found in the blood of a splenectomized *Cynocephalus* monkey inoculated with *Plasmodium knowlesi*. Pear-shaped, amoeboid, round and elliptical forms were all observed. Apart from the amoeboid forms, the largest dimensions of the parasites was rarely more than the radius of the red corpuscle. In nearly every case multiplication took place by division into two. Inoculation into monkeys of the species *C. papio*, *Silenus irus*, and *Cercopithecus callitrix* easily conveyed the disease, but in *Pan satyrus verus* (chimpanzee) transmission was difficult or was found to be positive only after splenectomy. The average incubation period was seven days. Symptoms are described and were chiefly concerned with the anaemia which followed the preliminary acute piroplasmosis. The disease is more severe in splenectomized animals. Resistance to the disease was diminished in animals in poor condition and the piroplasm was more virulent when inoculated from monkeys severely affected with anaemia. Stovarsol had no curative effect, but trypanblue and gonacrine caused rapid improvement. Inoculation experiments were performed on g. pigs, dogs and human beings, but were without results.

—S. J. GILBERT.

BRUMPT, E. (1938). Identification des piroplasmes du chien du type *Piroplasma canis*. Transmission de la souche française par la tique sud-africaine *Haemaphysalis leachi*. Faible valeur des épreuves d'immunité croisée dans les piroplasmoses. [**Piroplasms of Dogs of the Type *Babesia canis*. Transmission of the French Strain by the South African Tick *H.L.* Value of Cross-Immunity Tests in Piroplasmosis**].—*Ann. Parasit. hum. comp.* **16**. 97-116. [Numerous refs.]

*B.c.* is known to be transmitted under natural conditions by *H.L.*, *Rhipicephalus sanguineus* and *Dermacentor reticulatus*, and experimentally by *D. andersoni*. A dog which had passed through infections with strains from Morocco and France transmitted by *Rh.s.* and *D.r.* succumbed to infection with a strain of South African origin transmitted by *H.L.* The South African piroplasm maintained in dogs could not be transmitted in an experiment with *Rh.s.*, and this tick failed in other experiments to transmit the strain of French origin. Infection was, however, set up with *H.L.* and the French strain and infected nymphs transmitted the disease as adults. It was incidentally observed that *B. gibsoni* was not transmitted in the same conditions. Adult daughter ticks originating from *H.L.* females which had been fed on a dog infected with *B.c.* of French origin did not transmit infection. Infected larvae of *D.r.* did not transmit infection either in the nymph or adult stage, nor did adults which had been infected as nymphs. From tests of cross-immunity by blood inoculation, and also by natural infection with normal vectors,

it appears that strains of canine piroplasmosis possess different antigenic properties even though morphologically alike and transmitted by the same vectors. Piroplasms of the dog behave differently from piroplasms and anaplasms of cattle, in which a strong polyvalent immunity follows artificial or natural infection.

—S. J. GILBERT.

DSCHUNKOWSKY, E. (1938). Besondere anaplasmatistische Formen in den Blutkörperchen der Schafe und Rinder, nebst Beschreibung eines neuen Genus *Pirochroma*. [**Peculiar Anaplasma Bodies in the Blood Corpuscles of Sheep and Cattle Described as a New Genus, *Pirochroma***].—*Zbl. Bakt. I. (Orig.)*. 142. 86-89. 24 figs. on 1 plate. [4 refs.]

D. discusses the nature of anaplasms, and points out that chromatin granules in the red corpuscles may be remnants of the nuclear material of the cell, or they may be transmissible parasites—minute forms of *Babesia* or *Theileria* or true *Anaplasma* as described by THEILER. In reinvestigating a disease of sheep on the Dalmatian coast, he found that *B. motasi*, *B. ovis*, and *Th. sergenti* were involved; inclusion bodies also occurred, however, in the red blood corpuscles; they resembled anaplasms in that they showed no trace of cytoplasm, but differed in that they were irregular in size and commonly appeared as pear-shaped forms. Four individuals might occur in one cell. Infection of sheep caused high fever and sometimes haemoglobinuria. Similar inclusions were encountered in cattle blood in the valley of the Save.

D. considers that the difference in morphology prevents the inclusion of these parasites in the genus *Anaplasma*, and that as they contain no cytoplasm, they cannot be included in the genera *Babesia* or *Theileria*; he proposes, therefore, to create a new genus, *Pirochroma*, and to call the species of the sheep *P. inchiostrii*, and that of cattle *P. mayeri*. [No information is given as to whether these inclusions could be transmitted by blood inoculation].—U. F. R.

DONATIEN, A., & LESTOQUARD, F. (1938). Du cycle évolutif de quelques *Rickettsia*. [**Development Cycle of *Rickettsia***].—*Bull. Soc. Path. exot.* 31. 593-599. 8 figs. [8 refs.]

The authors record that in all rickettsial infections under study (*R. conjunctivae*, *R. canis*, *R. bovis*, *R. ovina*, *R. ruminantium* and *R. conori*) they were able to detect large inclusion bodies, which varied in colour from red to almost black when stained with May-Grünwald-Giemsa; in the cells infected by the various organisms. These inclusion bodies occur as large masses, and commonly indent the nucleus of the affected cell. At a later stage of the infections the massive inclusions become granular, and break up into coccus, ring and bacillary forms which stain lilac and are characteristic of rickettsial infection. In addition, in all the conditions under review, forms larger than rickettsial bodies were encountered, varying from 0.5  $\mu$  to 8  $\mu$  in diameter, apparently produced by the breaking up of the large inclusion bodies. These forms stained red to purple according to the species concerned. It is claimed that, in all these infections, stages of development occur similar to those described by BEDSON and others in psittacosis [*V. B.* 3. 861, and 5. 561.], and by MIGAYAWA in human inguinal lymphogranulomatosis. It is suggested that the large inclusion masses might be called "initial bodies", and the minute rickettsia forms "elementary bodies", whilst the intermediate forms which vary considerably in their morphology may represent the transmissible stage of the organisms. It is argued that, as all *Rickettsia* so closely resemble each other in their development cycle, they should all be retained in a single genus.—U. F. R.

ROSSI, S., & DETROYAT, C. (1938). Existence en France de *Rickettsia conjunctivae* du boeuf. [*R.c.* in Cattle in France].—*Bull. Soc. Path. exot.* **31**. 788-790. [7 refs.]

The authors record the detection, in various districts of France, of a conjunctivitis of cattle due to an invasion of the epithelial cells of the conjunctiva by *R.c.* The various stages of development of *R.c.* as described by DONATIEN and LESTOQUARD [*V.B.* **7**. 525.] could be demonstrated easily. The disease was benign, usually ending in complete recovery, but the parasitic infection was shown to persist for some time. No treatment of any specific value was discovered.

—U. F. RICHARDSON.

MEYER, K. F., EDDIE, B., & ANDERSON-STEWART, B. (1938). **Canine, Murine and Human Leptospirosis in California.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 17-19. [6 refs.]

A highly fatal disease of dogs, observed in San Francisco, was proved to be due to *L. canicola*. Icteric and haemorrhagic types were recorded, the latter type greatly resembling Stuttgart disease. Chronic nephritis frequently follows infection, and, contrary to the disease as observed in Holland, the Californian type is complicated by icterus. The disease may be contracted by man and is considered widely distributed.

*L. icterohaemorrhagiae* was demonstrated in rats, but not *L.c.*; the only reservoir of the latter was the dog, but it may also set up aberrant infections in man. The rat can transmit *L.i.* to both man and dog, but the transmission of this organism from dog to dog has not yet been demonstrated in the U.S.A.—H. N. S.

## DISEASES CAUSED BY VIRUSES

HINDLE, E. (1938). **Filterable Viruses, with Special Reference to Immunity.**—*Vet. Rec.* **50**. 1354-1360. Discussion pp. 1360-1366. [11 refs.]

H. has given a useful general summary of the present position regarding the virus diseases, which should be read in the original. Arguments are advanced in favour of the particulate nature and specific size of viruses obtained by ultra-filtration analysis, ultramicroscopy and high-speed centrifugation. The maintenance of antigenic individuality, irrespective of the animal species which a given virus infects, is stressed as affording a reasonable explanation that these agents are independent living beings. Mutations in viruses, *e.g.* a change from a viscerotropic to a neurotropic character, are described in some detail, and the various methods of inducing immunity are surveyed. The significance of the isolation of crystalline protein from certain plant viruses is briefly considered.

In the discussion which followed DALLING referred to the variations in the ability of viruses to resist external influences, and indicated the conditions which favour their preservation. He mentioned the importance of the adaptation of viruses to different animals and to the changes in virulence due to passage, *e.g.* the modification of distemper virus in the ferret and the immunization of the fowl with pigeon pox. He considered that secondary organisms found in certain virus infections became enhanced in virulence as a result of passage. The nature of a virus differing from distemper which had been recovered from the brains of foxes was discussed.

DUNKIN stressed the importance of a high virus content of tissues in order to obtain the best results from artificial immunization. He was not entirely in agreement

with DALLING in regard to the role of secondary invaders, and considered that a solid immunity against distemper virus protected against bacterial organisms.

—R. E. GLOVER.

- I. ROEMMELE, O. (1938). Maul- und Klauenseuche-Infektion bei in freier Wildbahn lebendem Muffelwild. [**Foot and Mouth Disease in Wild Mouflons**].—*Berl. Münch. tierärztl. Wschr.* Sept. 23rd. 577.
- II. WOLF, J. (1938). Die Bedeutung weniger- und nichtempfindlicher Tierarten für die Epizootologie der Maul- und Klauenseuche. [**Importance of Insusceptible Animals and Animals of Low Susceptibility in Relation to the Epizootology of F. & M. Disease**].—*Ibid.* Oct. 21st. 639-642. [Numerous refs.]
- III. WIEMANN. (1938). Die Maul- und Klauenseuche und ihre Verbreitung durch Zwischenträger. [**F. & M. Disease and its Transmission**].—*Dtsch. Tierärztebl.* 5. 109-112.
- IV. HOFMANN, F. (1938). Zur Frage der Uebertragung der Maul- und Klauenseuche durch Ratten. [**The Transmission of F. & M. Disease by Rats**].—*Oest. Tierarzt.* 11. 161-162.

I. A wild mouflon from the Harz mountains was examined by a veterinarian, who judged it to be affected with mouth lesions of F. & M. disease. It was sent to R., who confirmed the diagnosis. [In the circumstances recorded this cannot rank as an authenticated case of the disease].

II. A valuable review of the literature on the susceptibility of horses, dogs, cats, rabbits, hamsters, mice and other rodents, and hedgehogs to F. & M. disease. The evidence is in some cases incomplete. The horse is not susceptible; dogs and cats can be infected experimentally, though no natural cases have been reported; rabbits have been experimentally infected, but do not contract infection naturally; the same applied to hamsters, mice, and hedgehogs. All these animals have a negligible role in the spread of F. & M. disease.

III. W. states that in established outbreaks, after all the usual restrictions have been set up, human beings are by far the commonest intermediate carriers of infection, and that the various wild animals are unimportant in this respect. A recent order of the Reich Ministry of the Interior takes note of this and restricts the movement of farm personnel.

IV. H. relates from experience the way in which F. & M. disease was spread by rats in a community where an energetic cleaning and disinfection of cow byres had been carried out. He states that such work drives away rats, which move to another convenient building and by so doing may spread infection. Pigs were infected in this way from a byre.—J. E.

MANCINI, A. (1935). Le reazioni allergiche e la crisi emoclasica nelle malattie da virus filtrabili (peste bovina). [**The Allergic and General Reaction to the Virus of Rinderpest**].—*Nuova Vet.* 13. 181-188. 12 tables.

For the preparation of his own antigen, M. took 150 c.c. of virulent blood (defibrinated) from a calf in the third day of marked rinderpest, added 0.3 c.c. of formalin, and left the mixture for three days at normal temperature, stirring several times a day. He then made an emulsion by adding an equal quantity of castor oil. He also used a control antigen prepared similarly but from a healthy bovine.

Twelve calves taken during the first three days of their reaction to artificial infection with rinderpest virus, and five healthy calves, were each injected with 0.5 c.c. of the antigen intradermally into a subcaudal fold. Eight similarly affected

calves were given the control antigen. All of the affected calves developed a haemoclastic reaction, manifested by a leucopenia between 45 and 75 minutes after injection, followed by a leucocytosis after 90-105 minutes. No such reaction occurred in the other two groups of calves.

The reactions are said to have been more intense in animals in the earlier stages of rinderpest than in those in which diarrhoea had begun.—S. F. J. II.

ZWICK, W., WITTE, J., & SCHWARZMAIER, E. (1937). Weitere Untersuchungen über das Virus der Bornaschen Krankheit. [**Further Research on the Virus of Borna Disease**].—*Z. InfektKr. Haustiere*. **52**. 1-10. 4 tables. [8 refs.] [See also *V. B.* **8**. 433].

Results of viability tests are reported. Infected rabbit brain was still virulent after six years' desiccation over  $\text{CaCl}_2$  *in vacuo*, but was non-virulent after 2-9 months' (different samples) desiccation over KOH.

Dried infected brain powder placed in sealed tubes exposed to light and moderate heat lost its virulence in eight weeks, and similar samples kept in the dark were still virulent after 16 weeks, but not after 24 weeks.

Virulent brain in normal saline allowed to decompose at room temperature in darkness was still potent after 85 days, and similar brain tissue in equine urine was potent for 22 days.—J. E.

LYON, B. M. (1938). **Equine Encephalomyelitis and Its Control**.—*N. Amer. Vet.* **19**. No. 12. 22-30.

This is a review of the published work up to November, 1938.

"Following the distribution of  $1\frac{1}{2}$  million doses of vaccine in 1938 [in the U.S.A.], no protection failures have been recorded. The disease occurred up to five days after the initial dose of vaccine, indicating pre-infection". "Our studies indicate a marked increased degree of protection from 2 doses of vaccine as compared with a single dose."

Three horses given two doses of vaccine were solidly immune four months later to intracerebral inoculation of the virus, whereas three controls died. G. pigs are said to be protected in the same way for six months. The formolized chick embryo virus is a staple antigen when kept under refrigeration.—J. A. GRIFFITHS.

CARNEIRO, V. (1937). A encephalomyelite infecciosa dos equideos no Brasil. [**Equine Encephalomyelitis in Brazil**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo*. **8**. 115-134. 14 figs. on 8 plates. [Numerous refs.] [English summary].

A nervous disease of an epizootic nature occurring only in horses was diagnosed in Tatuhy (São Paulo) in March, 1937. The outbreak occurred during a period of exceptionally hot weather, about 60 horses being affected; some horses recovered, but sequelae such as blindness and unsteadiness frequently developed. The symptoms were those of a typical encephalomyelitis, and the disease ran its course in 2-6 days. It was possible to isolate from the brain a virus that passed through Berkefeld N and W filters; it was pathogenic to g. pigs, mice, pigeons and rabbits, and in its pathogenicity, both clinical and experimental, it was very similar to the American virus. The condition was reproduced in horses by the intracerebral or intranasal route; the incubation period was  $2\frac{1}{2}$ -5 days, and the clinical picture was similar to that of the natural disease. The g. pig is the best animal for the study and preservation of the virus; the histological picture shows typical non-purulent encephalomyelitis.—S. TORRES.

FOTHERGILL, Le R. D., & DINGLE, J. H. (1988). **A Fatal Disease of Pigeons Caused by the Virus of the Eastern Variety of Equine Encephalomyelitis.**—*Science*. **88**. 549-550. [6 refs.]

During a recent epizootic of equine encephalomyelitis in south east Massachusetts, pigeon breeders reported unusual losses in regions where the disease was prevalent. Filtered brain material from a dead pigeon was injected intracerebrally into young albino Swiss mice. They all died in 48-96 hours with symptoms similar to those seen in mice infected with the Eastern type E.E. virus. Cultures of the pigeon brain before injection and of the brains of the dead mice were sterile. The pigeon virus was identified as that of the Eastern variety of E.E. virus by injection into g. pigs previously immunized against the Eastern and Western varieties.

BOYNTON, W. H., WOODS, Gladys M., & WOOD, F. W. (1988). **Field Application of Hog Cholera Tissue Vaccine.**—*J. Amer. vet. med. Ass.* **93**. 291-296. 1 table. [6 refs.]

This report is published to show that tissue vaccine is an acceptable substitute for the serum plus virus method of obtaining an immunity to swine fever. The vaccine is prepared from a fine suspension of virulent tissues from an inoculated pig, the suspension being rendered avirulent by treatment with eucalyptol. A dose of this vaccine is followed two weeks later by a dose of virus. The method has been found safer than the serum-virus method. The vaccine is given when the pigs are six weeks old. Unthrifty or sick pigs are first vaccinated, then revaccinated when healthy, and finally given the virus. Weaned pigs are more likely to attain an immunity than sucklings. The breeding stock are given vaccine alone once a year. 15,125 pigs have been successfully treated by this method.—J. A. G.

PIGOURY, L. (1988). **L'agalaxie contagieuse de la chèvre au Liban. [Contagious Agalactia of Goats in Lebanon].**—*Bull. Soc. Path. exot.* **31**. 194-199. [3 refs.]

Contagious agalactia of goats is prevalent in Lebanon; it occurs mainly as a slowly spreading epizootic approximately every three years. It was found that one subcutaneous injection of 0.75 g. of stovarsol in 10% solution favourably affected the course of the disease, while urotropine had no effect. Preventive inoculation of these substances was not successful in preventing infection.

—P. S. WATTS.

JACOTOT, H. (1988). **La prophylaxie de la rage en Indochine. [Prophylaxis of Rabies in Indochina].**—*Bull. Off. internat. Epiz.* **16**. 249-252. [3 refs.]

J. describes methods tried out in Indochina for combating rabies in dogs. In 1984, the Pasteur Institute of Nhatrang prepared a vaccine; dogs were inoculated with fixed virus, and a 1:10 formol suspension was made of brain tissue. It was used as a preventive on dogs, being given twice, at three weeks' interval, or in some cases in a single dose. Between 1984 and 1987, about 10,500 dogs were vaccinated or revaccinated. J. considers, however, that to achieve success in the control of the disease, compulsory vaccination of all dogs would be necessary, together with extermination of all stray dogs.

FERRÁN, J. V. (1986). **La vacunación antirrábica por el método suprainensivo de Ferrán. [An Intensive Method of Vaccination against Rabies].**—*Siglo méd.* **97**. 675-676. [Abst. from abst. in *Bull. Off. internat. Epiz.* **15**. 65-66]. The virulent brain material for the vaccine is issued in 4 g. amounts, together

with sufficient perchloride of mercury solution to prepare a 10 % suspension. The mixture is made up freshly immediately before use. The dose is 2 c.c. on each of five successive days ; it is given to human beings subcutaneously in the abdominal region. The mercury salt is said to induce positive chemotropic action on the leucocytes of the animal vaccinated so that the premature transference of the intact rabies virus to the nervous centres by the blood is prevented. In laboratory tests the vaccine gave good results. In Spain this treatment is said to have failed in only 0.5 % of 45,000 cases.

HORGAN, E. S. (1938). **The Experimental Transformation of Variola to Vaccinia.**—*J. Hyg., Camb.* **38**. 702-715. 1 table. [Numerous refs.]

Material from virulent outbreaks of human smallpox applied to the skin of monkeys (*Ceropithecus sebaeus*) induced characteristic pustular lesions. In one experiment the monkey strain was established in the rabbit by serial intratesticular or intradermal injections of the virus. Animals so infected were subsequently found to be immune to a standard vaccine lymph.

H. regards his experiments as an example of true mutation of variola into vaccinia, since he considers that contamination with vaccine virus was excluded.

—R. E. GLOVER.

HURST, W. E. (1938). **Myxoma and the Shope Fibroma. 4. The Histology of Shope Fibroma.**—*Aust. J. exp. Biol. med. Sci.* **16**. 53-64. 10 figs. [7 refs.] [See also *V. B.* **7**. 605].

After 17 direct testicular passages in series, neither the OA nor the IA fibroma virus produced lesions more closely resembling those of myxoma than those produced by the original virus before the passages were undertaken. The histological picture from the initiation of the lesion to the ultimate regression are fully described, and also the differences in the cellular responses to these two fibroma viruses. H. is of the opinion that the Shope fibroma is not an intermediate stage "on the road to neoplasia", but is merely a peculiar reaction to a virus infection.—D. A. G.

- I. RIVERS, T. M., WARD, S. M., & SMADEL, J. E. (1938). **A Soluble Antigen from Infectious Myxomatosis in Rabbits.**—*J. Bact.* **36**. 285.
- II. BERRY, G. P. (1938). **A Non-Lethal "Mutant" Strain of Virus Myxomatosis Derived from Fibroma Virus.**—*Ibid.* 285-286.
- III. HOFFSTADT, Rachel E., & PILCHER, K. (1938). **The Use of Chorio-Allantoic Membrane of the Developing Chick Embryo as a Medium in the Study of Virus Myxomatosis.**—*Ibid.* **35**. 353-368. 14 figs. on 2 plates, 3 tables. [8 refs.]
- IV. HOFFSTADT, Rachel E., & PILCHER, K. S. (1938). **A Further Study of the Cultivation of Virus Myxomatosis on the Chorio-Allantoic Membrane of the Chick Embryo.**—*Ibid.* **36**. 286.
- V. VAN ROOYEN, C. E., & RHODES, A. J. (1938). **The Immunological Relationship of Shope's Rabbit Fibroma Virus to the Virus of Infectious Myxomatosis: Complement-Fixation Studies.**—*Zbl. Bakt. I. (Orig.)*. **142**. 149-158. 2 tables. [8 refs.]

I. The authors have previously reported [*V. B.* **8**. 289.] the presence of a soluble antigen in virus-free filtrates prepared from the infected skin and from the serum of rabbits affected with myxoma.

Methods of purification and the chemical and physical characteristics of the antigen have been studied. Rabbits inoculated with the partially purified antigen dealt with in the earlier paper developed precipitins against the antigen in their

serum, but responded as normal animals to myxoma, neuro-myxoma and fibroma viruses.

II. By inoculation of a rabbit with a mixture of active fibroma virus, present in a suspension of fibromatous testicle, and a suspension of washed myxoma elementary bodies heated at 80°C. (30 min.), the author obtained a non-lethal strain of myxoma virus which he called 80-A. He called it a "mutant" strain because it suddenly appeared with distinctive characteristics which persisted through 23 passages in rabbits in the course of 13 months. It had a low mortality rate and the condition caused could be readily distinguished from myxomatosis and fibroma. Its cultural characteristics differed from those of myxoma.

Inactivated 80-A and fibroma virus, on inoculation into a rabbit, yielded a strain apparently identical with 80-A, which on serial passage appeared stable.

III. The method employed for obtaining a bacteria-free inoculum and for egg inoculation is described. The age of the embryo at inoculation was ten days.

Changes in the chorio-allantoic membrane were most readily produced at an incubation temperature of 37°C. It was later found that chilling by exposure to a temperature of 25°C. caused more profuse changes, especially when incubation was done at a temperature of 35°C.

The virus was passaged serially 33 times through the chorio-allantoic membranes, with evident increase in titre as judged by graduated dilutions inoculated intradermally into rabbits.

Examination of sections of membranes indicated that the primary and most significant changes occurred in the ectoderm. Granular bodies, apparently similar to those seen in myxomatous tissue in rabbits, were consistently present in the cytoplasm of the cells of the ectodermal, mesodermal and endodermal layers of the chorio-allantoic membrane.

IV. It was shown that the optimal temperature for growth was 33°-35°C. The virus grew more readily after a number of serial passages. It caused an infection in the embryo resulting in gross pathological changes, changes in blood picture, and a reduction in hatchability.

V. By means of c.-f. tests, the authors studied specific and cross-reactions between myxoma and fibroma antisera and the respective antigens. Three methods of production of anti-myxomatous sera were used. The technique of the c.-f. test employed is described, and the results are tabulated.

No cross-reactions were observed. The reactions were specific for both fibroma and myxoma virus, and the authors conclude that their work has failed to show any serological relationship between the two viruses.—L. E. HUGHES.

ANDREWES, C. H., & AHLSTRÖM, C. G. (1938). **A Transplantable Sarcoma Occurring in a Rabbit Inoculated with Tar and Infectious Fibroma Virus.** —*J. Path. Bact.* 47. 87-99. 3 figs. on 1 plate, 2 charts. [11 refs.]

The authors have already shown [*V. B.* 9. 162.] that the infectious fibroma virus may produce in tar-treated animals tumours resembling true neoplasms. In this article they describe a fibro-sarcoma induced in the rabbit by similar means.

The animal was treated with tar on several occasions and was subsequently injected intravenously with fibroma virus. A fibro-sarcoma was produced which was passaged through several generations of rabbits and finally became transmuted into a metastatic sarcoma which was not invariably progressive. The fibroma virus entirely disappeared and no other virus was demonstrable. Moreover, immune fibroma serum failed to neutralize the sarcoma. Stimulation of regressing tumours of this type was effected by injecting fibroma virus intravenously.

—R. E. GLOVER.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

DZASOCHOV, G. S. (1937). Rolj členistonogih v perenose infekcionoi anemii lošadei i osnovinje mery po borijbe s nimi. [**The Role of Arthropods in the Transmission of Equine Infectious Anaemia**].—*Sovyet. Vet.* No. 4. pp. 26-29.

D. mentions the possibility of E.I.A. being transmitted by arthropod parasites, but the body of the article is devoted to measures for the control of such parasites.

MOORE, W. (1938). **Report upon Hill of Fare "Sheep Tick". Eradication Experiment for 1937.** pp. 11. 1 table. [fcp] [Mimeographed].

This report includes the details of the plan and first year's progress of a long term experiment upon the control, by serial dipping, of the sheep tick *Ixodes ricinus* on a 6,000 acre hill in southern Aberdeenshire, separated from other tick-infested areas by several miles of arable land. The attack was concentrated upon the adult female, which is parasitic upon mammals only. The number of wild mammals was reduced to a minimum by systematic shooting and trapping. 471 sheep inoculated with louping ill vaccine, and 29 not inoculated, were grazed on the hill from May to October. All the sheep, except six controls, were dipped each week in a derris dip. The most efficient strength of derris was found to be one part *Derris elliptica* (containing 5% rotenone) to 500 parts of water. During the year 36 of the inoculated and 13 of the un-inoculated sheep died. The continuous dipping had no apparent adverse effect upon the sheep.

In north-east Scotland the tick is active from early spring to late autumn, with a peak period in July.

MACKERRAS, M. J. (1938). **Losses Due to the Sheep Blowfly.**—*J. Coun. sci. industr. Res. Aust.* 11. 97-102. 5 tables. [Numerous refs.]

After setting out the sheep population and average wool production per sheep in the principal wool producing countries, the relative incidence of fly strike and the species of flies concerned are briefly dealt with. Consideration is then given to estimates which have been made by various observers of the losses (financial and otherwise) in Great Britain and the Dominions, with a detailed consideration of the position in Australia. Previous estimates in Australia, the basis for which is not quoted, have varied enormously. Whereas, for instance, FROGGATT in 1914 put the loss at £1,000,000 per annum for New South Wales, McLEOD and HOLME at about the same time estimated it at £377,700. The great difficulty of arriving at a dependable estimate is obvious, since, in addition to costs of prevention and curative measures, the loss by deaths, deterioration of the fleece, loss of struck wool and interference with growth and nutrition must also be taken into account. The actual costs of fly strike in three studs and five ordinary flocks, collected and published by BELSCHNER in 1937 [*V. B.* 8. 578.], averaged £198 per 1,000 stud sheep and £35 per 1,000 flock sheep. Using this latter figure as a basis and assuming it to be applicable to the whole sheep population of Australia, the total cost to the Commonwealth would be approximately £3,856,000. [As M. remarks, to apply BELSCHNER's average for flock sheep to the whole of Australia "may or may not be justifiable". The costs in the five ordinary flocks he investigated varied from £8 to £93 per 1,000 sheep]. It is pointed out that while the cost of some preventive measures is considerable, the advantage of the fold removal operation, or selective breeding for a relatively plain bodied type, is that a considerable degree of permanent protection may be obtainable without increasing production costs.

—D. A. GILL.

MACFARLANE, W. V. (1988). **Blowfly Strike in Marlborough. Incidence and Control Discussed.**—*N.Z. J. Agric.* 57. 888-892. 2 figs., 1 table.

M. discusses the incidence and control of myiasis in Marlborough. Maggots found on sheep were bred out at the Cawthron Institute, Nelson, and found to be chiefly *Calliphora laemica*. About 590 of the Marlborough strikes contained specimens of *Lucilia sericata*. *Chrysomya rufifacies* and *Ophyra analis* were rare. In contradistinction to Australian findings, a succession of flies in a lesion was found to be unusual in New Zealand.

Urine staining, largely in the presence of crutch wrinkles and vulval malformations, was considered to be the main predisposing factor to crutch strike. Back strike is considered more important than crutch strike in New Zealand.

—L. W. N. FITCH.

- I. FRENEY, M. R. (1987). **Studies on the Chemotropic Behaviour of Sheep Blowflies.**—*Pamphl. Coun. sci. industr. Res. Aust.* No. 74. pp. 24. 2 figs. on 1 plate, 6 tables, 3 graphs. [15 refs.]
- II. MACKERRAS, I. M., & FULLER, M. E. (1987). **A Survey of the Australian Sheep Blowflies.**—*J. Coun. sci. industr. Res. Aust.* 10. 261-270. 1 fig., 7 tables. [12 refs.]
- III. LEE, D. J. (1987). **A Laboratory Method for Testing Tropisms of Blowflies.**—*Ibid.* 271-274. 1 fig.
- IV. MCCULLOCH, R. N. (1987). **The Present Position in Blowfly Control in New South Wales with Special Reference to the Problems Associated with Jetting.**—*J. Aust. Inst. agric. Sci.* 3. 129-187. 8 figs. [20 refs.]

I. After a review of the literature, the methods and apparatus used are described, the latter being illustrated. The chemotropic responses of sheep blowflies were studied by field trapping methods, and it was assumed that the attractiveness of a bait to any species was proportional to the number trapped. A large number of pure chemicals were tested, including many known to be formed during putrefaction. Of these only ethyl mercaptan was attractive. Tests with numerous tissues showed that none were specifically attractive to primary flies.

It was found that alkaline sulphides and neutral or slightly alkaline buffering agents enhanced the attractiveness of carrion to all species of flies, while poisons, preservatives and protein precipitants prevented carrion from becoming attractive. The addition of small amounts of calcium carbonate to carrion increased both its attractiveness and the amount of volatile sulphur compounds subsequently evolved.

Tests with a type of trap used in the field showed that the addition of sodium or calcium sulphide to the bait resulted in an increase in the numbers of flies trapped.

When the odour of acetic acid was allowed to mingle with the odours of putrefying spleen, the attractiveness of the latter was enhanced, while the odours of chlorine or iodine decreased this attractiveness.

Distillation and extraction of attractive carrion baits did not yield highly attractive substances. Hydrolysis of certain unattractive materials—e.g. fresh egg yolk and egg white—with sodium sulphide solution rendered them attractive. Preparations from the skin and excreta of sheep were not attractive to flies. "Struck" fleece appeared to be only slightly attractive.

II. This paper summarizes the results of an extensive survey of several years' duration. Examination of material from 1,691 strikes from all the sheep-raising areas of Australia showed that *Lucilia cuprina* is the most important and wide-spread of the sheep blowflies in the Commonwealth. *Calliphora* spp., particularly *C. nociva*, are responsible for about one-fifth of the strikes, chiefly in

southern districts, but *L. sericata* is of no practical importance. The species of flies which attack sheep in Australia are listed. Tables show "strikes" recorded from commercial flocks in six States, field strikes recorded in the experimental flock maintained at the laboratory at Canberra, the incidence of flies according to regions (moist, temperate, and hot, arid areas being compared) in commercial flocks, the relative incidence of the species of *Calliphora* in strikes, the relative incidence of strikes on different parts of the sheep, the incidence of species in strikes on different sites, and, finally, the strikes due to one species only. The distribution of flies is discussed, and that of *L.c.* illustrated by a map.

III. The apparatus used is fully described and the numerous difficulties encountered are discussed. The chief object of the apparatus was to test the olfactory tropisms of flies. It was necessary to fulfil a number of requirements: the apparatus should be large enough to permit freedom of flight, illumination should be equal for all aspects of the apparatus, and chance catches in empty traps should be reduced to a minimum. The apparatus and difficulties encountered cannot be fully described in an abstract.

IV. The author states that there is at present little promise of finding the "solution of the blowfly problem" by methods aiming at a reduction in the blowfly population. Such methods include biological control, carcass destruction, trapping and poisoning.

Measures which aim at protecting the sheep are maintenance of health, breeding for insusceptibility, the Mules operation, hand dressing, crutching, and jetting. It does not appear that susceptibility can be reduced by breeding or by surgical removal of wrinkles, to the point of rendering repeated crutchings or jetting unnecessary and thus avoiding constant handling. Hand dressing cannot be much improved, for even if the ideal dressing were discovered, the method would still involve excessive handling of sheep during a fly "wave". Present dressings give almost complete freedom from re-strike, except during a fly "wave". Crutching is a valuable measure, but is expensive, cannot be carried out on short notice at the onset of a fly "wave" and will not carry ewes through the lambing period in an insusceptible state. Jetting, though slightly less effective than crutching, is much cheaper and can be carried out at very short notice at the onset of a fly "wave". A combination of crutching and jetting, modified according to district and season, appears to offer the cheapest and most effective method for control of fly strike. Certain objections to jetting are discussed and its technique is illustrated.—H. McL. GORDON.

KNIPLING, E. F., & RAINWATER, H. T. (1987). **Species and Incidence of Dipterous Larvae Concerned in Wound Myiasis.**—*J. Parasit.* 23. 451-455. 3 tables. [4 refs.]

A study of the species of fly larvae concerned in 900 instances of wound myiasis in man and animals, occurring between June 1935 and April 1936 in the south eastern and to a lesser extent in the middle western and south western States of the U.S.A., showed that *Cochliomyia americana* [= *C. hominivorax*], spoken of as the primary screw worm fly, was present in 90% of the cases. Other species occurred in 18% of cases, the commonest being *Phormia regina* and *Lucilia sp.* *C. macellaria* and *Sarcophaga sp.* occurred in a few cases.

The highest numbers of cases of wound myiasis, both by *C.a.* and by secondary species, occurred in cattle and swine. Relatively few occurred in sheep, horses and mules. The secondary species were taken from a wider range of hosts than was *C. americana*.—J. MACLEOD.

DOTY, A. E. (1937). **Convenient Method of Rearing the Stable Fly.**—*J. econ. Ent.* **30**. 367-369. [6 refs.]

D. describes previous work on the rearing of *Stomoxys calcitrans* and gives details of a method devised for breeding these flies in large numbers for insecticidal tests of cattle sprays. Compared with the housefly, the stable fly is less resistant to sprays containing pyrethrum, rotenone or thiocyanates. The reaction of the stable fly to repellents is similar to that of the housefly.—R. P. HOBSON.

ROBERTS, F. H. S. (1938). **Cattle Lice: Their Economic Importance in Queensland.**—*Aust. vet. J.* **14**. 55-58. [8 refs.]

The following species of lice have been recorded from cattle in Queensland:—*Haematopinus curysternus*, *H. tuberculata*, *Linognathus vituli*, *Solenoptes capillatus* and *Bovicola bovis*. Most of these species appear to be widely distributed. The species chiefly implicated is *H.e.*; next in importance is *L.v.* There is abundant evidence that heavy infestations can be responsible for much loss in condition. Lice may be present at any time of the year, but it appears that infestations reach serious proportions only in certain circumstances, *viz.*—in winter and spring when pastures are dry, animals are poor in condition, external temperatures are moderate and the animals have their winter coats; during drought, when poverty appears to be the predisposing factor; on unthrifty animals at any time of the year, and on animals in good condition when stabled for any considerable length of time and not groomed.

It appears that the prevalence of lice can best be explained, not directly by any one of the factors mentioned above, but by the assumption that the activities of the parasites are in some way governed by the condition of the skin or coat. With the advent of good rains the coat is washed clean and with the resultant good supply of nutritious food the skin and coat so become unfavourable for the propagation of the parasites.—H. McL. GORDON.

PEREIRA, C. (1937). Dados ecologicos sobre ovos e nymphas hexapodas de "boophilus microplus" (Canestrini, 1888). [**Ecology of the Eggs and Hexapod Larvae of B.m.**]—*Arch. Inst. biol. Def. anim., S. Paulo.* **8**. 135-144. [English summary].

P. observed that all eggs floating on water hatched after the normal incubation period (41 days), but that only 25% of eggs immersed in water hatched normally. Eggs buried as deep as 10 cm. in earth naturally dry or saturated with moisture hatched in the normal time. Larvae that had been moistened in different ways had a lowered resistance to the normal conditions of life. They could live for 73 days immersed in water; the most efficient exciting agent while in the resting state was heat. They refused to attack human beings in experimental conditions. In the culture tubes, which were 1 m. high, the larvae formed clusters about 7 cm. from the bottom; P. infers that in nature the larvae of *B.m.* stay chiefly on the lower parts of plants, and climb to the higher parts only when disturbed.

—S. TORRES.

HENRY, M. (1938). **The Kangaroo Tick.**—*Aust. vet. J.* **14**. 69-71.

*Argas Gurneyi-Warburtoni* is normally a parasite of kangaroos, but it has also been recorded from other native fauna, from dogs, and occasionally from man. It is confined to an extensive semi-arid area of Western and Central Australia, the Northern Territory and Western Queensland. The adult ticks are said to occur in the soil up to two inches below the surface, under trees, bushes, etc., on kangaroo camps, in wallaby caves, and elsewhere. On man, the tick may become

fully engorged in 5-10 minutes. The bite is often severe and may give rise to a large swelling and sometimes alarming symptoms, including loss of consciousness and visual disturbances, and the area surrounding the bite may become completely anaesthetized. When bitten, kangaroos did not hop away for ten minutes or so, even on the approach of human beings, and finally hopped very unsteadily.

—H. McL. GORDON.

I. BARTELS, & DÖRING, J. (1938). Die Bekämpfung der Schafräude in den Reg. Bezirken Kassel und Erfurt im Jahre 1937. [**Control of Sheep Scab in the Kassel and Erfurt Districts in 1937**].—*Dtsch. tierärztl. Wschr.* **46**, 291-298. 3 tables.

II. BARTELS. (1938). Ueber Verluste beim Baden von Schafen. [**Losses in the Dipping of Sheep**].—*Ibid.* 433-436.

I. A detailed account of the 1937 campaign. In the Kassel area every flock of sheep was dipped, and in the Erfurt area only those in which sheep scab had been found at a preliminary examination. Double dipping with lime sulphur was used, and was applied by travelling outfits consisting of a dipping tank and cooking apparatus for preparing the dip fluid, three men being in attendance. Veterinary surgeons directed the work and examined all sheep about six weeks after the second dipping. About 182,000 sheep were dipped, with an efficiency approaching 100%.

II. In the above campaign, 156 sheep died from the effects of dipping. The cause of death was the entry of lime-sulphur into the alimentary tract, nasal cavities and sinuses or into the lungs; 115 of the casualties died from pneumonia. The P.M. diagnosis of these three effects of the dip is detailed.

The factors having an influence on such mortality are discussed; it is impossible to guarantee that no loss will occur, but it can be avoided to a large extent. [See also *V. B.* **9**, 319, for data on types of dipping tanks. In 1937 one type only—the so-called medium tank—was used].—J. E.

KOTLÁN, S. (1936). A rühatkák fajlagosságának kérdéséhez. [**Specificity of Mange Mites**].—*Állatorv. Lapok.* **59**, 345-347. [12 refs.]

This is a review, and it contains no original observations. K. discusses the Sarcoptidae at some length and adds notes on the other mange mites. He refers to the different varieties of *Sarcoptes* of man and animals and says that *S. canis* is not species-specific, but that *S. bovis* is so, and suggests that other varieties lie between these two species in this property. [The evidence on this point is very meagre and it seems probable that adequate *ad hoc* research still remains to be done].

K. points out that mites may be conveyed to an unusual host and that they may then burrow into the skin and set up a typical mange lesion, but that unless they can also reproduce and persist as a colony through a number of generations, they cannot be said to be true parasites on the new host; the fact that parasites may cause a lesion in an unusual host in which it heals spontaneously is not evidence that the parasites are not species-specific.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

MORGAN, D. O., & WILSON, J. E. (1938). **Observations on the Helminth Parasites of Poultry in Scotland.**—*J. Helminth.* **16**, 165-172. 1 table. [4 refs.]

In the course of a survey extending over two years, the authors recorded

observations on the helminth parasites found during P.M. examinations of 1,118 fowls ranging in age from six months to two years. The species encountered are enumerated and the percentage of birds carrying parasites and the average incidence is given.

On the assumption that gross infestation with any species is pathogenic, it was found that the only species present in sufficient numbers to be likely to cause wide-spread damage were *Heterakis gallinae*, *Capillaria* spp. and *Davainea proglottina*. The number of species recorded during the course of the survey was low.

No significant relationship was noted between parasitized fowls and the common diseases of poultry, including fowl paralysis. In the table, the figures for all species encountered, except one, are lower for the healthy birds examined than for the diseased birds of the survey; they are also lower for healthy birds of the survey than for birds on a poultry farm where the incidence of F.P. was particularly high. In the 58 cases of tuberculosis examined, worms were very often absent, or present in small numbers only.—L. E. HUGHES.

- I. WETZEL, R., & ENIGK, K. (1986). Ein Beitrag zur Kenntnis der Parasitenfauna des deutschen Hochwildes. [The Parasites of German Mountain Game].—*S. B. Ges. naturf. Fr. Berl.* pp. 162-164.
- II. WETZEL, R., & ENIGK, K. (1987). Ein weiterer Beitrag zur Kenntnis der Parasitenfauna des Elches (*Alces alces*). [Parasites of the Elk].—*Z. Parasitenk.* 9. 695-697. [11 refs.]

I. The authors report what they claim to be the first record of the helminths mentioned below:—*Fasciola hepatica* was found, in the European bison and elk, apparently originating from infested red or fallow deer on the same ground. Eggs of *Moniezia* sp. were found in the faeces of the elk and bison, in the former apparently derived from Canadian animals infested with *M. benedeni*. Eggs of *Strongyloides* sp. were demonstrated in the faeces of bison and mouflon sheep. Nematode eggs which appeared to be those of *Ostertagia* or *Trichostrongylus* occurred in the faeces of bison and elk, and eggs of *Nematodirus* sp. in the faeces of elk. *Haemonchus contortus* and *O. circumcincta* were observed P.M. in an elk. *Dictyocaulus viviparus* occurred in bison, probably from red deer, fallow deer and roe deer, which were also found to be infested. *Muellerius capillaris* occurred in bison, *Trichuris globulosa* in elk, and eggs of *Tr. ovis* in the faeces of bison and mouflon. In addition, cysts morphologically resembling those of *Eimeria zurnii* were found in bison, and *E. intricata* cysts in the faeces of elk.

II. Further to their list in I [above] the authors report the finding of four more new helminth parasites in the European elk. Several *Setaria labiato-papillosa*, 50-75 mm. long, were recovered P.M. from the abdomen of one animal, and *Strongyloides papillosus* was recovered from the small intestine of another, which was also infested with *Bunostomum trigonocephalum*. A *Cysticercus* was recovered from another elk [see next abstract]. An elk infested with *Cephenomyia* also yielded third stage larvae of *Pharyngomia picta*, previously only found in the red deer.

- WETZEL, R., & ENIGK, K. (1988). Muskelfinnen beim Elch. [Cysticercosis in the Muscles of Elk].—*Z. InfektKr. Haustiere.* 52. 273-281. 2 figs., 3 tables. [Numerous refs.]

*Cysticercus* was demonstrated for the first time in a European elk; the animal was also heavily infested with nematodes. *C. tenuicollis* were found in the parenchyma, connective tissue and serous coat of the liver. Cysts were also found in the myocardium and the left masseter muscle.—A. T. PHILLIPSON.

ALICATA, J. E. (1988). **Observations on the Life History of *Fasciola gigantica*, the Common Liver Fluke of Cattle in Hawaii, and the Intermediate Host, *Fossaria ollula*.**—*Bull. Hawaii agric. Exp. Sta.* No. 80. pp. 22. 6 figs., 8 tables. [16 refs.]

After giving a short historical résumé of fascioliasis in Hawaii, A. states that *Fasciola gigantica* is the only liver fluke so far recovered, and, of the fresh-water snails present, *Fossaria ollula* is the only intermediate host. At a temperature of 78°-82°F. eggs of *Fasciola gigantica* required 14 days to hatch as miracidia.

The various stages in the snail are described. Motile cercariae were found to escape from snails 39 days after experimental infestation. Metacercariae encysted on honohono plants which were replanted in an exposed sunny area, were found to be viable after 15 days but not after 42 days, indicating the lethal effect of sunlight and dryness on encysted metacercariae. Encysted metacercariae kept in running water for 122 days were able to infect laboratory animals. No live metacercariae were recovered from infected ensilage after three months storage.

The highest dilution of copper sulphate found to be effective against newly hatched miracidia was 1:92,000. Sea water either undiluted or diluted 1:1 with fresh water was also effective. The characteristics and locations of *Fossaria ollula* are described.—R. FISHER.

EDGAR, G. (1988). **Paramphistomiasis of Young Cattle.**—*Aust. vet. J.* 14. 27-31. 2 figs. [7 refs.]

The author describes *P. cervi* infestation affecting young dairy cattle less than one year old. The disease occurs in late winter months on the south coast of New South Wales, and mortality may be as high as 80%. Anaemia, debility and diarrhoea are the characteristic symptoms. Concurrent infestation with *Monodontus phlebotomus* appears to be a contributing factor. Numerous immature *P.c.* were found in the duodenum, the mucosa of which showed considerable hypertrophy. It is suggested that the fresh-water snail *Bullinus gibbosus* is probably the intermediate host.—H. McL. GORDON.

I. PENFOLD, W. J., PENFOLD, H. B., & PHILLIPS, Mary. (1988). **The Distribution of *Cysticercus bovis* in the Sites of Election in the Ox.**—*Med. J. Aust.* Jan. 15th. 107-118. 2 tables. [5 refs.]

II. PENFOLD, H. B. (1988). **An Attempt to Immunize Lambs against Hydatid Disease.**—*Ibid.* Feb. 26th. 375-377. [18 refs.]

I. In 145 infested cattle examined, the distribution of cysts between the heart, the masticatory muscles, the tongue and the diaphragm was in the ratio of approximately 8:4:1:1. In about 88% of animals with only 1-3 cysts distributed in the heart, the masticatory muscles, the tongue or the diaphragm, infestations may be detected by complete examination of the heart and masticatory muscles alone. It is stated that probably in all animals with four or more cysts distributed in the heart, the masticatory muscles, the tongue or the diaphragm, infestation may be detected by complete examination of the heart alone. In practice it was found that, in light infestations, if four cysts were found at the sites of election, four cysts were also found in the whole dressed carcass, whereas in heavy infestations the proportion between findings at a site of election and in a whole dressed carcass was 1:20.

II. No immunity sufficient to protect against infestation was produced in any one of four lambs, each inoculated with a total of 66 ml. of antigen consisting of ground hydatid membrane suspended in carbolized hydatid fluid. P. states that examination of faeces for ova is not a satisfactory method for detecting light

infestations with *Echinococcus granulosus* in dogs. It is noted that hydatid cysts produced in nine-month-old sheep by feeding with echinococcus ova were sterile, and measured 2.5 mm. in diameter.—H. McL. GORDON.

HARWOOD, P. D., & LUTTERMOSER, G. W. (1938). **The Influence of Infections with the Tapeworm, *Raillietina cesticillus*, on the Growth Rate of Chickens.**—*Proc. helminth. Soc. Wash.* 5. 60-62. 1 table.

The authors paired off chickens 2-4 weeks old according to weight and gave one of each of 41 pairs various numbers of infective cysticercoids of *R.c.* (obtained from *Aphodius spp.* and *Tribolium spp.* of beetles), the other chick in each pair serving as a control.

The diet fed to the first experimental birds was low in available manganese and resulted in one case of "porosis" [? perosis], but the diet was adjusted for the remaining experiments.

The weights of the chicks were recorded at weekly intervals and the greater increase in each experiment was in the control birds. In spite of "porosis" the control bird in the first experiment gained weight more quickly than its infested mate.

The number of cysts fed varied from 40 to 1,000, and the most tapeworms found in any bird six weeks after dosage was 155 (1,000 cysts fed).

Critical analysis of the results indicated that the infestations had an injurious effect, proportionate to the degree of infestation, on the growth rate of chicks fed adequate rations, this effect being enhanced when the diet was deficient in manganese.—C. V. WATKINS.

LUCKER, J. T. (1938). **Vertical Migration, Distribution, and Survival of Infective Horse Strongyle Larvae Developing in Feces Buried in Different Soils.**—*J. agric. Res.* 57. 335-348. 1 fig., 5 tables. [14 refs.]

Migration of larvae to the surface was found to be significantly affected by soil type. This factor also appeared to influence the number of larvae persisting in the faeces and deeper soil layers a few months after the faeces had been buried. Increased depth of burial in a given soil clearly reduced the degree of migration of larvae from the faeces to the soil surface. It is probable that the inverse relationship between depth of burial and amount of migration of larvae to the surface is in some degree related to the effect of depth of burial on larval development or survival, or both. [For experimental results the original must be consulted].

—R. FISHER.

SUGIMOTO, M., & NISHIYAMA, S. (1937). **On the Nematode, *Tropisurus fissispinus* (Diesing, 1861) and its Transmission to Chickens in Formosa.**—*J. Jap. Soc. vet. Sci.* 16. 305-313 of pt. 1. 5 figs. on 1 plate, 3 tables. [8 refs.] [In Japanese: abstr. from English summary pp. 37-39 of pt. 2].

Investigations in Formosa have shown that the grasshoppers *Pternoscirta sauteri*, *Heteropternis respondens*, *Gastrimargus transversus*, and *Atractomorpha bedeli*, the cockroaches *Periplaneta americana*, and *P. australasiae*, and the earthworms *Perichaeta candida* and *Allolobophora foetida*, must now be regarded as additional intermediate hosts for *Tr.f.* in chickens and ducks.

Grasshoppers, cockroaches and earthworms reared under experimental conditions were fed chicken droppings containing embryonated eggs of the nematode. Infestation was readily acquired, and the larvae became infective in 9-28 days.

The infective larva is 1.5 to 2 mm. long. The head end is blunt and simple, but the tail end has a circle of 12 equal papillae. The muscular portion of the

oesophagus averages  $182\mu$  and the glandular portion  $448\mu$ . Distinct cross striations may be observed in the cuticle.

Ingestion of the intermediate host sets the larvae free in the proventriculus, where they enter the glands of Lieberkühn and become mature in about 90 days.

—D. D. OGILVIE.

BACHMAN, G. W., & GONZALEZ, J. O. (1936). **Immunization in Rats against *Trichinella Spiralis***. —*Proc. Soc. exp. Biol., N.Y.* **35**. 215-217. [3 refs.]

Attempts were made to immunize four groups of rats against *T. spiralis*. The methods tried were the feeding of trichina antiserum, of dry trichina powder or of increasing doses of infested meat, and the intraperitoneal injections of Coca's alkaline suspension of trichina powder. The only method which gave any protection was the feeding of infested meat. Rats so treated survived feeds of 10 mg. of infested meat, which is twice the lethal dose for normal rats.

BUCKLEY, J. J. C. (1938). **On *Culicoides* as a Vector of *Onchocerca gibsoni* (Cleland & Johnston, 1910)**.—*J. Helminth.* **16**. 121-158. 9 text figs., 29 figs. on 5 plates, 9 tables. [Numerous refs.]

B. discusses the possible vectors of *O.g.* and suggests that *Culicoides* may be responsible. A high percentage of cattle in Malaya are infested. Diagnosis of *O.g.* in live cattle was carried out by examining slices of skin placed on a slide with normal saline and searching for microfilariae. Estimates were also made of the intensity of skin infections, which varied considerably. *Culicoides* were collected on live cattle, and microscopic examinations were made, some at once and some after maintenance in the laboratory. The various species of *Culicoides* and *Lasiohelea* are enumerated, and the morphology of the various filarial larvae found is described. It was found that 0.52% of 1,523 *C. pungens* dissected soon after an infective blood meal had picked up microfilariae, 0.96% of 1,670 dissected some days after an infective meal were found to have developing or mature filarial larvae in the thorax or head, and 0.35% of this species were found to be naturally infected. Other species of *Culicoides* were found to carry microfilaria to a varying degree.

—R. FISHER.

RAO, M. A. N. (1938). ***Dipetalonema dracunculoides* (Cobbold, 1870)**.—*Indian J. vet. Sci.* **8**. 127-130. 3 figs. [6 refs.]

The presence of *D.d.* in India is recorded for the first time. R. obtained 18 male and 48 female worms from the peritoneal cavity of an indigenous dog.

The male worms are 22-27 mm. in length, with smooth cuticles and tapering extremities. The tail is spirally coiled and bears two lateral digitations. There are six pairs of anal papillae and two unequal spicules. The mouth is simple and has two lateral papillae. The female worms are 30-55 mm. long. The head end is similar to that of the male, but the tail end is simple, and uncoiled. The vulva is about 1.5 mm. from the head end. The embryos are unsheathed,  $200-225\mu$  in length, and are indistinguishable from those of *Microfilaria lewisi*.—D. D. OGILVIE.

VAN DEN BERGHE, L. (1937). Une microfilaire du sang de l'éléphant au Congo Belge. [**A *Microfilaria* from the Blood of an Elephant in the Belgian Congo**].—*Ann. Parasit. hum. comp.* **15**. 229-230. 2 figs.

A microfilaria isolated from the blood of a young African elephant—one of 42 elephants examined—showed the following characteristics when stained with Giemsa:—no sheath, posterior end prolonged, anterior end rounded and broad, length  $180-200\mu$ , breadth  $6.5-7\mu$ . The "nuclei" were very small, measuring less

than  $1\mu$  in diameter, and were arranged in rows of 6-8 across, except at the posterior end where they were arranged in a single line. The column of nuclei was broken by a definite band  $2\mu$  wide which was about  $85\mu$  from the anterior end.

B. states that microfilariae have never before been seen in the blood of elephants in Africa, and thinks that this specimen should be given the name of *Microfilaria loxodontis*.

## IMMUNITY

CELORIA, M. (1988). La production de tuberculine dans certaines milieux synthétiques. [**Production of Tuberculin in Synthetic Media**].—*Boll. Sez. ital. Soc. int. Microbiol.* 10. 69-70. [In French].

C. compares three different synthetic media for tuberculin production. The richest growth and the highest yield of tuberculin were obtained with Sauton's medium. In comparison the medium of Model and Lidelnikowa contains a larger quantity of bipotassium phosphate and glycerin, less magnesium sulphate and no asparagine (pH 7.4). In Wong's medium, glycerin is replaced by glucose and saccharose, and nitrogen is derived from ammonium malate (pH 7.2). If the pH becomes more alkaline during the preparation of the medium, a precipitate of phosphates is formed and the nutritive value of the medium is lost. C. maintains that the two latter media have no advantages over Sauton's medium.—E. C. HULSE.

GOTTSCHALL, R., & BUNNEY, W. E. (1988). A Diluent for Stabilizing Tuberculin "O.T." Diluted for the Mantoux Test.—*J. Immunol.* 34. 103-115. 5 tables. [17 refs.]

A diluent of borax, boric acid, and sodium chloride containing 0.04% gum arabic and 0.5% phenol with pH 7.2 was used to dilute 21 different tuberculins to  $10^{-4}$ ; in 85% the potency was not diminished when incubated at  $37.5^{\circ}\text{C}$ . for 85 days. The tuberculin was found to remain stable after prolonged shaking in glass vials, after exposure to indirect sunlight for four months at laboratory temperature, and after transportation to tropical climates.—E. C. HULSE.

HOOKE, S. B., & BOYD, W. C. (1987). The Nonspecificity of the Flocculative Phase of Serologic Aggregation.—*J. Immunol.* 33. 337-353. 1 plate, 2 tables. [Numerous refs.]

Quoting freely from the literature, the authors have shown that whilst MARRACK, HEIDELBERGER, TOPLEY, DUNCAN and their respective followers believe that visible flocculation consists of the specific formation of a three-dimensional lattice-work of antigen-antibody molecules joined by free antigen, there are, nevertheless, grounds for the belief that antibody-antigen molecules unite specifically and that the subsequent formation of larger (visible) particles is a non-specific reaction.

If there is excess antigen in a precipitative reaction no precipitate is formed, whereas excess antibody has only a slight effect in this direction. According to the lattice theory, however, excess of antigen or of antibody should inhibit the reaction equally. [This argument would be more convincing if available evidence suggested that antigen and antibody molecules are of the same order of size]. If a bacterial suspension is mixed with a very strong antiserum all the antigen surface would be coated with antibody, leaving no free antigen. According to the lattice theory, therefore, all strong antisera should inhibit agglutination, but this is not actually the case. Again, the lattice theory does not satisfactorily explain the need for electrolyte in serological reactions.

Passing on to their own experimental data the authors claim that the velocity of flocculation in the region of excess antibody is a linear function of the dilution of the antigen which can be expressed in terms of a recognized theory of organic flocculation. By mixing two non-cross-reacting flocculating systems (the two antisera having approximately the same flocculation velocity) it was found that the velocity of flocculation increased in proportion to the total number of antigen molecules in the mixture. This point supports the theory that flocculation is a secondary non-specific phase of precipitation or agglutination. According to the lattice theory, on the other hand, the mixing of two independent systems should retard flocculation on account of the molecules in the two systems interfering with one another and slowing down the rate of contact between corresponding antigen and antibody molecules.—E. J. PULLINGER.

- I. PIROSKY, I. (1938). Sur l'existence, chez les variantes smooth et rough d'une souche de *Pasteurella aviseptica* de deux antigènes glucido-lipidiques sérologiquement distincts. [**Two Serologically Distinct Glyco-Lipid Antigens from Rough and Smooth Strains of *Past. aviseptica***].—*C. R. Soc. Biol. Paris*. **128**. 346-347. [2 refs.]
- II. PIROSKY, I. (1938). Sur la spécificité des antigènes glucido-lipidiques des *Pasteurella* et sur leurs affinités sérologiques avec les antigènes glucido-lipidiques des *Salmonella*. [**The Specificity of the Glyco-Lipid Antigens of *Pasteurella* and Serological Affinities with those of *Salmonella***].—*Ibid.* 347-350. [4 refs.]

I. Sera were prepared in rabbits from rough and smooth variants derived from the same strain of *Past. aviseptica* (No. 2482, Lister Institute). Cross-precipitation tests performed with these sera, using as antigens glyco-lipids obtained from trichloroacetic acid extracts of the variants, demonstrated that the antigens were serologically distinct.

II. Antigenic glyco-lipids prepared from four strains of *Pasteurella* showed several points of similarity with antigens of the same nature prepared from typhoid and Gärtner bacilli, namely in their reactions to anti-bacterial and to sera against the glyco-lipids, and in their behaviour in the presence of certain chemical salts.  
—A. W. T.

SCHWARTZ, R. (1938). De la production des anticorps au moyen de l'immunisation "concentrée" avec le BCG chez le lapin. [**"Concentrated" Immunization with BCG in Rabbits**].—*C. R. Soc. Biol. Paris*. **127**. 100-103. 1 ref.]

Two groups of rabbits were inoculated with single or multiple doses of BCG and the subsequent antibody production was estimated by the complement-fixation test. Frequently repeated small doses (0.05 mg. four times daily for seven days), introduced subcutaneously into different parts of the body, produced a serum more rapidly and richer in antibody than did the inoculation of one large dose (2 mg. subcut.). In rabbits receiving multiple injections into one or two sites only there was extensive inflammation at those sites, and a high mortality.—E. C. HULSE.

WOLTERS, K. L., & DEHMEI, H. (1938). Experimentelle Versuche zur aktiven Immunisierung mit Alaunpräzipitat-Mischimpfstoffen. [**Active Immunization with Alum Precipitate Mixed Vaccines**].—*Dtsch. tierärztl. Wschr.* **46**. 342-345. 8 tables. [12 refs.]

G. pigs were inoculated with an alum-precipitated toxoid mixed with a vaccine of a bacterium of a species different from that which produced the toxin, and antibodies against the toxin and bacterium were formed independently and as effectively

as if either antigen had been inoculated alone. It is suggested that a useful veterinary application of this would be the simultaneous immunization of horses against strangles when they are being immunized for the preparation of either diphtheria or tetanus antitoxin.—E. J. PULLINGER.

- I. RAMON, G. (1937). L'immunité et l'influence des "substances adjuvantes et stimulantes" injectées en mélange avec l'antigène. Introduction à une étude d'ensemble. [Immunity and the Influence of Adjuvant and Stimulating Substances Mixed and Injected with Antigen].—*Rev. Immunol.* 3. 198-201. [Numerous refs.]
- II. RAMON, G., LEMETAYER, E., & RICHOU, R. (1937). De l'activité immunisante des mélanges d'anatoxine et de substances adjuvantes. [Immunizing Activity of Mixtures of Anatoxin and Adjuvant Substances].—*Ibid.* 202-218. 19 tables. [Numerous refs.]

I. R. had observed that in some horses hyperimmunized with *Corynebacterium diphtheriae* anatoxin, after the high titre had been reached, a well marked and persistent rise occurred instead of a progressive fall in antitoxin content. In such animals he found inflammatory lesions at the point of injection, set up by contaminating organisms. In further experiments it was found that when tapioca was mixed with the inoculum the tapioca had an effect similar to that of the contaminating bacteria in the earlier observations; after extensive trial the inocula used for immunizing horses against the toxins of *Corynebact. diphtheriae* and *Cl. tetani* consisted of the appropriate toxoid mixed with tapioca. For the immunization of human beings against these two toxins, the addition of T.A.B. antityphoid vaccine instead of tapioca was found more suitable. R. claims that the addition of the bacterial vaccine has an adjuvant effect on the toxoids in the production of immunity against diphtheria and tetanus.

II. The authors claim that mixtures of cholesterol and vaseline, or of lanolin and olive oil, with *Corynebact. diphtheriae* and *Cl. t.* anatoxins are more effective antigens than the toxoids alone. The addition of saponin to anatoxin also had an adjuvant effect. They found that the repeated injection, intradermally or subcutaneously, of small doses of anatoxin evoked a much better response than the injection of one large dose. They suggest that when a mixture of anatoxin and lipid substances is injected, small amounts are released into the body gradually over a period, thus stimulating a higher degree of antitoxin formation.—C. McG.

SÉDALLIAN, P., JOURDAN, F., & CLAVEL, C. (1938). Peut-on aborder l'étude physiologiques des immunités antitoxiques ou antimicrobiennes? (1er mémoire). [The Physiological Study of Antibacterial and Antitoxic Immunity. I].—*Rev. Immunol.* 4. 211-215.

SÉDALLIAN, P., JOURDAN, F., & CLAVEL, C. (1938). La répartition des anticorps dans l'organisme immunisé (2e mémoire). [The Distribution of Antibodies in the Immunized Organism. II].—*Ibid.* 216-229. [Numerous refs.]

After two months of active immunization of rabbits with toxin or bacteria there was an absolutely uniform distribution of antibody throughout the cardiovascular system. To study the distribution of fixed antibody in the tissues the authors bled out immune rabbits and then perfused the vascular system with large volumes of isotonic saline to wash out all residual blood. Thereafter tissues were desiccated and known amounts were suspended in saline and tested for residual blood serum and for antibody. Apart from exudate fluid, most serum protein was found in the skin and thereafter in the liver, kidneys, subcutis and myocardium. Residual antibodies predominated in the pleura, testicles, subcutis, heart, skin and

aorta. Subsequently, citrated horse plasma was used in place of saline for perfusing; this resulted in the lungs also showing a high degree of antibody retention.

—E. J. PULLINGER.

BOWER, J. O., MENGLE, H. A., & PAXSON, N. F. (1938). **The Demonstration of Antitoxin for the Toxin of *Clostridium Welchii* in the Blood Serum of Patients and Dogs that have Recovered from Spreading Peritonitis Complicating Acute Perforative Appendicitis.**—*J. Immunol.* **34**. 185-193. 5 tables. [9 refs.]

Spreading peritonitis was produced in experimental dogs by ligation of the appendix and dosage with castor oil to induce early perforation. A control mortality of over 90% was reduced to less than 30% by part treatment with *Cl.w.* antitoxin. The lyophilized serum [see *V. B.* **9**. 348.] of dogs that had recovered from the disease was allowed to stand at room temperature for 329 days, and then tested for antitoxin. It was found that 1 c.c. mixed with one M.L.D. of *Cl.w.* toxin and incubated at 37°C. for 45 minutes, protected two out of three 350 g. pigeons, inoculated intramuscularly.—R. O. MUIR.

EATON, M. D. (1938). **Recent Chemical Investigations of Bacterial Toxins.**—*Bact. Revs.* **2**. 3-45. 1 table. [Numerous refs.]

In this article the subject is reviewed under three main headings, as follows:—

(1) **THE PRODUCTION OF BACTERIAL TOXINS.**—Present-day research is being directed mainly towards devising protein-free synthetic media for the production of toxins, for in such medium the toxin could easily be concentrated by differential precipitation methods. Up to the present no notable progress has been made in this direction. Other research includes the study of factors, apart from pure nutrients, which may influence toxin production. Such factors include the oxidation-reduction potential, and the presence of optimal amounts of certain "essential impurities" which occur as unavoidable ingredients of complicated media, *e.g.* copper and iron, unidentified organic stimulants, and carbon dioxide. Carbon dioxide may exert its influence by altering the pH of the medium and/or by exerting specific influence upon the metabolic processes on which toxin formation depends.

(2) **CONCENTRATION AND PURIFICATION OF TOXIN.**—The aim in concentrating toxin is to reduce it to the minimum bulk possible without losing more than the smallest possible traces in the process. Methods of concentration include fractional salt precipitation—used for streptococci and staphylococci; acid or enzyme digestion methods—used for salmonella, shiga and coliform types, and alum hydroxide precipitation—used for diphtheria toxin. No toxin has yet been sufficiently purified for justifiable claims to be made regarding its chemical structure, and actually in judging the purity of toxins the available criteria are unsatisfactory. Crystallized toxins have not yet been prepared and consequently reliance has to be placed upon the attainment of a constant ratio of weight or nitrogen content to biological activity, optical rotation, molecular weight, precipitability by protein precipitating reagents, and iso-electric points. In addition, clinical and serological tests (the latter for specific proteins), may be carried out for certain anticipated impurities. Analysis by hydrolysis or digestion has yielded but little information beyond the fact that peptide linkages are essential to the activity of toxins, but this does not mean that toxins are simple polypeptide chains; in fact tryptic digestion of salmonella toxin has given rise to the suggestion that certain toxins are lipid-carbohydrate complexes.

(3) **CHANGES PRODUCED BY CHEMICAL AND PHYSICAL AGENTS.**—Toxins may be denatured by heat and strong acids, but certain chemicals, and in particular

formaldehyde, can modify the toxic action without affecting the toxin's combining power. This process of toxoiding has not been satisfactorily explained, and it is not even entirely certain whether the process of toxoiding is irreversible or not, since there is some evidence that if toxoiding is not yet complete the removal of formaldehyde is accompanied by a return of toxicity. Soaps also affect toxicity, probably by cloaking the toxin rather in the way that antitoxin produces a cloaking effect. Vitamin C is also claimed to affect toxin adversely, but there is much evidence to suggest that such an effect, whether appearing *in vitro* or *in vivo*, is due purely to increasing acidity.—E. J. PULLINGER.

MENKIN, V. (1938). **The Role of Inflammation in Immunity.**—*Physiol. Rev.* **18**. 366-418. [Numerous refs.]

Following a comprehensive definition of inflammation, a summary is given of recent advances in knowledge relating it to the broader aspects of immunity. The inflammatory reaction is regarded by M. as the physical basis of infectious processes, and thus as an immunological mechanism of definite significance. The various stages in its development are described from the introduction of an irritant until its ultimate disposal.

Interference of a live or inert agent with local protein katabolism is alleged to provoke the formation of a relatively simple crystalline polypeptide, tentatively named leukotaxine, which causes increased capillary permeability. This factor, together with an elevation of capillary pressure, produces increased fluid passage through the capillary endothelium. The localization of the irritant is accomplished by the mechanism of fixation involving the occlusion of the lymphatic drainage by a fibrinous network and thrombi. In allergic inflammation, the basic mechanism is reinforced by the presence of immune bodies. The properties of leukotaxine, recovered from exudates, suggested that it also contains a factor concerned in the chemotaxis which causes the rapid migration of polymorphs into an inflamed area. Development of a local acidosis from increased glycolysis and depletion of the alkali reserve appears to injure the polymorphs, with a resultant predominance of mononuclear macrophages when the pH falls to a level of 6.8-6.9. Further reduction in the pH proves lethal to all types of leucocytes, and frank suppuration ensues, leading to organization and repair of the affected tissue. The part played by lymphocytes and plasma cells in certain types of inflammation remains undetermined.—R. O. MUIR.

NATTAN-LARRIER, L., STEEG, L., & DUFOUR, J. (1938). Le pouvoir anticomplémentaire naturel. [Natural Anticomplementary Power].—*C. R. Soc. Biol. Paris*. **128**. 861-863. [5 refs.]

Maintenance at 49°C. for 45 minutes was preferred to heating to higher temperature or storage at 5°C. for destruction of complement or haemolysin in serum, since the latter methods rendered the serum anticomplementary. Horse serum, though devoid of complement, was found to have a high anticomplementary titre, and g. pig serum, rich in complement, to have little or none.—R. O. MUIR.

### DISEASES, GENERAL

PEREN, G. S., HUDSON, A. W., MORTON, A. C., & YATES, C. C. (1938). **The Economics of the Intensive Rotational Grazing of Sheep.** 1st Annual Report.—*Bull. Massey agric. Coll.* No. 9. pp. 86. 10 figs., 6 tables, 8 appendixes. [1 ref.]

It is claimed that the general health of the experimental flock was normal, and that the death rate (7%) was about the average, for the class of animal used *viz*, old ewes.

The Veterinary Department of the College was, unfortunately, unable to undertake the diagnosis of the causes of death, and so out of a total of 35 deaths no less than 16 (45·7 %) are given as due to causes unknown ; but as the majority of these occurred when grazing was good and plentiful it would not appear that the mortality was in any way due to the method of feeding.—F. J. ANDREWS.

WEISNER, E. S. (1937). **Death Losses Increasing in Pullet Flocks. Fifteen Years' Mortality Records in Michigan Egg Laying Contest Show Pullet Mortality Limiting Poultry Industry.**—*Bull. Mich. agric. Exp. Sta.* No. 20. pp. 80-85. 3 tables.

The mortality rate amongst pullets at the inception of the Michigan Egg Laying Contest 15 years ago (November, 1922) was in the region of 10-15 %. The average mortality rate during the eight year period ending October, 1937, was 26-53 %. Breed seems to have had little influence on these figures. The most common causes of death appear to have been fowl paralysis, ruptured oviduct, peritonitis, laryngotracheitis and roup.—L. E. HUGHES.

ANON. (1938). **County Egg Laying Trials, 1937-38.** pp. 3. 2 tables. London : Ministry of Agriculture. [fcp] [Mimeographed].

The results show that the mortality rate has more than doubled since that recorded in the years 1930-1931. The mortality rate in the chief four breeds represented varied from 15·09 to 20·93 %, the latter figure referring to the White Leghorn and the former to the Light Sussex varieties. Of the four principal breeds represented, the latter produced the smallest number of scoring eggs. The Rhode Island Reds had a mortality rate of 15·62 % with an egg production superior to that of the White Leghorns. The chief causes of mortality are not indicated.

—L. E. HUGHES.

ANON. (1938). **National Egg-Laying Test, 1936-37.**—*J. Dep. Agric. Eire.* 35. 93-161. 2 figs. on 3 plates, 14 tables.

This is a very full report of the National Egg Laying Test, but the part of chief veterinary interest is that dealing with mortality.

During the year 68 birds died (9·6 % of the flock). The deaths were confined to a comparatively small number of pens. The chief causes of mortality were ovarian diseases, parasitic infestations, gout and tuberculosis. Attention is drawn to the increase in the incidence of worm infestations and coccidiosis, which together caused almost 30 % of the deaths. In previous years these parasites were relatively unimportant.

A table giving detailed results of the P.M. examinations and one giving the number and percentage of deaths for each breed are included.—J. E. WILSON.

SMITH, J. H. (1938). **Losses by Death, Depreciation, and Reduced Production in Poultry Flocks.**—*J. Minist. Agric.* 45. 660-666. 5 tables.

S. collected information on losses in numbers and money due to deaths, sales and culling in laying flocks in Wales during the previous three years.

The death rate varied between 15 % and 17 %, and the culling and selling rate amounted to 32-39 % of the flock. These factors were responsible for a yearly reduction of the original flock to half its size.

The relationship between deaths and sales and the causes of death and depreciation are discussed. The losses due to fall in egg production were studied, and the average productive life of the birds was found to be less than 18 months.

—J. E. WILSON.

SHILLINGER, J. E. (1937). **Diseases of Fur Animals.**—*Fmrs' Bull. U.S. Dep. Agric.* No. 1777. pp. 22. 7 figs.

This is a popular publication for owners of fur farms and should serve a useful purpose. The bulletin includes sections on sanitation and disease control measures, infectious diseases, internal and external parasites, nutritional disturbances, and injuries and wounds. Under the heading "Infectious Diseases", notes are given on distemper, the fox encephalitis due to a virus, paratyphoid sometimes accompanied by jaundice, and infectious enteritis caused by members of the salmonella group.—L. E. HUGHES.

RIDALA, V. (1938). Ueber das Vorkommen von Jungtierkrankheiten in Estland. [**Diseases of Young Animals in Estonia**].—*III. Balti. Valsty. vet. Kongr. Protokol.* 1937. pp. 81-96. [In German].

This article is mainly concerned with the diseases of young pigs, of which influenza is said to be the most common. The mortality rarely reaches 20%. An account of swine influenza is given, and a vaccine from cultures of the *Haemophilus* suspended in saline and killed by heating to 55°C. for one hour on each of two successive days is described. Various doses were given at various time intervals; apparently the dosage is not yet standardized, and results cannot yet be judged. Other infections of young pigs are described, including *coli* infections, coccidiosis, strongylosis, *Cysticercus tenuicollis*, and lungworm infestation. Numerous other minor affections are noted but not dealt with in detail, such as castration infections and avitaminosis.—P. S. WATTS.

- I. GOERTTLER, V. (1938). Die allgemeine Bekämpfung der Unfruchtbarkeit der Rinder in Thüringen. [**Control of Sterility in Cattle in Thuringia**].—*Dtsch. Tierärztebl.* 5. 878-880.
- II. SCHUMANN. (1938). Das Sterilitätsbekämpfungsverfahren bei Rindern in Schlesien. [**Control of Sterility in Cattle in Silesia**].—*Ibid.* 380-382. 2 figs., 1 table.
- III. EICHMANN. (1938). Planmässige Bekämpfung der übertragbaren Geschlechtskrankheiten und der Unfruchtbarkeit beim Rindvieh in den Höhengebieten der Rheinprovinz. [**Control of Contagious Genital Diseases and Sterility in Cattle in the Highlands of the Rhine Province**].—*Ibid.* 382-384. 3 tables.
- IV. BOENIG. (1938). Praktische Erfahrungen in der Sterilitätsbekämpfung bei Rindern und Stuten. [**Practical Experience in the Control of Sterility in Cows and Mares**].—*Dtsch. tierärztl. Wschr.* 43. 705-707.
- V. FRANZEN, M. (1938). Sterilitätsbekämpfungsverfahren bei Stuten und Rindern in der Landesbauernschaft Saarpfalz. [**Methods of Control of Sterility in Mares and Cows in Saarpfalz**].—*Ibid.* 707-711.

These are all administrative reports and give particulars of the organization of the work in the provinces named. The campaign against bovine sterility is on a voluntary basis.

I. Up to 1937, 75,000 animals (21% of the possible total) were enrolled. 29,600 of them were either pregnant or capable of breeding, whilst 8,000 were incapable of breeding at the time of examination and 26,400 required veterinary treatment.

The extra work thrown on the farmer, the costs of the veterinary service and the heavy secretarial work done by the organizers, are discussed.

II. In 1987 a total of 70,178 cows were examined; 14,495 required treatment, and 2,582 were found useless for breeding. Notes are given on the method of keeping records and on therapeutic technique.

III. Statistics are not given, but details of organization, treatment and charges are included.

IV. A general discussion of clinical work. Metritis was the cause of sterility in 66.5% of 18,752 cases examined in 1987.

V. This deals chiefly with mares, the control of sterility in these animals being obligatory in Germany. The work is done mostly by trained specialists who pay great attention to the clinical diagnosis of pregnancy. The control of sterility in cattle is voluntary, partly on grounds of expediency.—J. E.

RICHTER, J., & GEHRING, K. (1987). Ueber erbliche Krämpfe bei neugeborenen Kälbern. [**Congenital Tetany in Newborn Calves**].—*Berl. tierärztl. Wschr.* March 19th. 177-180. 8 figs. [Numerous refs.]

A record of three cases of generalized tetany in three calves born on a farm containing 11 cows. The tetany was intermittent and death took place on the third, seventh and eighth days respectively after birth. One calf was carefully examined P.M., but no organic abnormality was seen. The genetical history of the herd is described and the conclusion is drawn that the condition was a simple recessive semi-lethal factor.—J. E.

SAN AGUSTIN, G. (1988). **Chronic Septicemia in a Water Buffalo**.—*J. Amer. vet. med. Ass.* 93. 264-266. 8 figs.

The author reports the symptoms lasting for a fortnight observed in a water buffalo, some of which were of a nervous type.

Three types of organism were isolated from the spinal fluid. One of these gave a bi-polar staining reaction and proved pathogenic for mice. Its pathogenicity for bovines was not tested. [This is presumably the reason for the word "septicaemia" used in the title].—L. E. HUGHES.

BLUMER, C. C., & HINDMARSH, W. L. (1988). **Dermatitis of Cattle Associated with Stomatitis and Locomotory Disturbance**.—*Aust. vet. J.* 14. 52-55. 1 table.

This is a description of a disease of unknown aetiology which affected both beef and dairy cattle in the Northern Tablelands of N.S.W. during April and May of 1986. In eight outbreaks which were investigated the incidence varied from 5% to 22.5%. Only in one instance did deaths occur, and it was then thought to be due to exposure and severe weather during the course of the disease. The symptoms, which appeared suddenly, were anorexia, hypersalivation (due to ulceration of the buccal mucosa), nasal and ocular discharge, a stiff and stilted gait, rapid loss of condition and a varying degree of dermatitis. This latter varied from slight "scalding" and subsequent scaliness to complete exfoliation of the epidermis over considerable areas. Almost all parts of the body were affected irrespective of pigmentation. Recovery, apart from the after-effects of the dermatitis, was very rapid in most cases. Outbreaks occurred over a wide area, involving markedly different soil and pasture types. There had been scattered rains in February, in March there were dull skies and scattered showers with no severe changes; April was very dry and the pastures rapidly ripened and dried off. The disease was attributed by stock owners to various causes such as toadstools, to photosensitizing plants such as *Polygonum* and *Tribulus spp.* and to ergotized paspalum, but these factors were not consistently present in the different outbreaks,

In one instance cattle became affected after they had grazed in a limited area for some weeks, but a close examination of the paddock revealed no plant which could reasonably be suspected.—D. A. GILL.

FILMER, J. F. (1988). **Ovine Posthitis and Balano-Posthitis ("Pizzle Rot"):** Some Notes on Field Investigations.—*Aust. vet. J.* 14. 47-52. 4 tables. [5 refs.]

Ovine posthitis is suggested as a suitable name for the disease commonly known as balanitis or "pizzle rot", since it is the prepuce which is primarily affected. Wethers can contract the disease when only a few months old; 40-90% of wethers may be affected and the disease is commoner in rams than is generally supposed. The early lesion is a small ulcer close to, but not involving, the preputial orifice. The ulcer, if unchecked, eventually surrounds the preputial orifice and extends to the mucous membrane and glans penis. F. believes the disease to be due to an infection which is favoured by the presence of urine-soaked wool. He found that the disease developed slowly, some 3-4 months elapsing before it had invaded the preputial cavity. Tests were carried out to discover a practicable method for curing the early lesions. Good results were obtained with 10% copper sulphate in vaseline, and this is now used as a routine treatment. Of 153 wethers treated with these copper sulphate ointments, 78% were cured after one treatment, 90% after two treatments and 96% after three treatments at weekly intervals. It is essential, besides clipping the surrounding wool, to remove all scab and necrotic tissue, with as little haemorrhage as possible, and to ensure that the ointment adheres to all parts of the lesion. If the preputial cavity is involved in wethers it is essential to incise it to ensure drainage and adequate treatment. When the disease affects rams early lesions can be treated as in wethers, but if the preputial cavity is involved the condition is always serious since incision is unsafe owing to subsequent distortion, which endangers the ram's usefulness. If the penis can be extended, the removal of all necrotic tissue and use of 10% copper sulphate solution is effective. If extrusion is impossible frequent douching with 5% copper sulphate is used, but such rams are usually unable to serve ewes again.

It is considered that inspection and "ringing" (i.e., shearing the wool for about six inches around the preputial orifice), at three- to four-monthly intervals, of all rams and wethers, together with the segregation and treatment of cases as soon as they are found, would eliminate advanced cases, and avoid serious loss from the disease.—D. A. GILL.

NEWSON, I. E. (1988). **A Bacteriologic Study of Liver Abscesses in Cattle.**—*J. infect. Dis.* 63. 282-289. [5 refs.]

Examination was made of 100 livers condemned at abattoirs. In smears and anaerobic cultures *Fusiformis necrophorus* was isolated from nearly all cases. Occasionally *Corynebacterium pyogenes* and a white coccus were present. It is stated that high incidence of liver abscesses in Colorado may possibly be due to the feeding of beet by-products.—S. F. BARNETT.

BARNES, J. E. (1988). **Dry Sweating in Horses.**—*Vet. Rec.* 50. 977-979.

The disease is described as it occurs in Ceylon, and it is stated that 90% of horses recover when moved from the hot, humid atmosphere of Colombo to the more temperate climate of the hills.

Palliative treatment and the aetiology of the condition are briefly discussed. It is suggested that the disease is due to imbalance of blood salts caused by adverse climatic conditions, and it is stated that in innumerable sections made of the skin

of "dry horses", the sweat glands appeared normal. [According to STEWART, in India, in three of his specimens, of which two were examined in Muktesar and one in Dublin, there was atrophy and degeneration of these glands—*V. B.* 9. 261].  
—F. J. ANDREWS.

SFORZA, M., & GENTILE, A. (1937). Tentativo di trasmissione e risultati di stomosinoterapie nella pleuropolmonite influenzale degli equini. [**Transmission of Equine Influenza Pectoralis and Treatment with "Stomasin"**].—*Clin. vet., Milano*. 60. 9-18. 10 figs. on 2 plates, 1 table.

The authors describe an outbreak of influenza pectoralis in 1928-1929, affecting 180 mules and 470 horses belonging to an artillery regiment in Padua. In March, 1935, the disease again occurred, this time in 80 out of 150 animals of the same unit. The authors, though they do not provide evidence, assume that the later outbreak was due to the virus that was latent in the system of recovered animals. They describe unsuccessful attempts to set up the disease in healthy horses by inoculation with material from the cases.—S. F. J. HODGMEN.

MEŽAKS, P. (1938). O vospalenii bymeni u korov. [**Bovine Mastitis**].—*III. Balti. Valsty. vet. Kongr. Protokol. 1937*. pp. 57-59.

Notes on the occurrence of bovine mastitis in Latvia. Infection is usually due to streptococci; tuberculous mastitis is rare. There is reference to the occasional occurrence of inflammation of the udder in new-born foals and calves, and to the appearance of lactation in young maiden heifers 6-8 months old.

KUPPUSWAMY, A. R. (1938). **Pig Rearing and Preliminary Investigation into the Existence of Swine Fever (?) in Province Wellesley.**—*Indian vet. J.* 15. 143-186. 24 figs. on 8 plates, 3 tables, 22 charts, 1 map. [9 refs.]

A description is given of the conditions under which pigs are reared and marketed. K. carried out an investigation of the disease known in Province Wellesley (Penang, Malaya) as swine fever, which affects young pigs, from the suckling stage up to eight months of age, but rarely adults. Investigation indicated that neither S.F. nor paratyphoid of pigs was the cause in any pigs examined. Macroscopic and histological findings were those of septicaemia. Diagnosis was mainly based on clinical symptoms, P.M. lesions, age of pigs affected, mortality, and cultural, biological and histological findings. Nine young pigs, five g. pigs, two white rabbits, three white rats and one white mouse were inoculated with blood and urine of infected pigs; neither swine fever nor *Salmonella cholerae-suis* infection was demonstrated. Bacteriological investigation failed to reveal *S. cholerae-suis*, and blood smears gave negative results. Lymph node smears contained streptococci, staphylococci and Gram-negative bacilli. Faecal examination revealed ova of *Ascaris*, *Ancylostoma*, and *Trichocephalus*, and oocysts of *Eimeria deblickei*. Ova of *Stephanurus dentatus* were demonstrated in the urine. It is stated that the disease may have been caused by dietetic errors in pigs heavily infested with helminths. Of 724 pigs infected, 26.79% recovered.—J. A. GRIFFITHS.

KITT. (1938). Neuzeitliche Anschauungen über die Kropfkrankheit. [**Recent Opinions on Goitre**].—*Münch. tierärztl. Wschr.* 89. 241-246. [5 refs.]

Goitre can be divided into four groups:—(a) athyroidism *i.e.*, complete lack of function due to hereditary or pathological disturbances, myxoedema being present; (b) hypothyroidism of unknown cause leading to changes similar to those seen in (a), but less severe; (c) hypothyroidism associated with exophthalmic goitre, which may be due to excessive iodine intake or to individual idiosyncrasy

to normal amounts of iodine, and (d) dysthyroidism in which dysfunction of the thyroid leads to endemic goitre. Iodine is only one of the factors involved in this disease; deficiency of vitamins and heredity may play a part. The occurrence of endemic goitre in relation to iodine, geographic distribution and the radio-activity of water in various geographic formations is fully discussed.—A. T. PHILLIPSON.

CHAMBERS, F. (1936). **The Incidence of Cancer in Domestic Animals.**—*Vet. Rec.* **48**. 698-702. 4 tables. [20 refs.]

In C's experience cancer in herbivorous animals is relatively uncommon, and of the carnivorous animals, dogs are most frequently affected. In horses tumours most frequently occur in the penis and bladder, in cattle in the liver, and in dogs in the mammary glands. It has been suggested that liver tumours in cattle are due to irritation by liver flukes present. Diet would appear to have some influence on the incidence of cancer in dogs.

In a discussion on the paper there was reference to identification of neoplasms, to mouse neoplasms, and to treatment of certain neoplasms with colchicine.

—HUGH N. SPEARS.

VALADE, P. (1937). Le cancer expérimental chimique. [**Experimental Cancer Due to Carcinogenic Agents**].—*Rec. Méd. vét.* **113**. 449-469. 5 figs. [Numerous refs.]

A review of recent work on experimental cancer, with particular reference to:—(a) occupational cancer; (b) carcinogenic agents, their discovery and nature; (c) the production of experimental cancer, choice of animal, technique and the anatomy and histology of lesions produced, and (d) the relationship between carcinogenic agents and certain biological substances. A useful bibliography is appended.—GWILYM O. DAVIES.

GORER, P. A. (1938). **The Antigenic Basis of Tumour Transplantation.**—*J. Path. Bact.* **47**. 231-252. 6 tables. [Numerous refs.]

This paper is a discussion of the immunity reactions which determine the fate of transplanted neoplasms. There is some evidence that malignant cells are antigenically different from the tissues from which they arise, but under ordinary conditions of transplantation such differences do not afford a sufficient stimulus to the organism to enable it to destroy the foreign tissue. The ability to survive in the presence of antigenic differences may be a very important property of malignant cells.

Genetic evidence suggests that the stimuli determining destruction of tumour grafts are the result of iso-antigenic differences and that the substances produced will therefore be iso-antibodies.—E. G. WHITE.

WHITE, E. G. (1938). **A Suprasellar Tumour in a Dog.**—*J. Path. Bact.* **47**. 323-326. 1 text fig., 6 figs. on 8 plates. [9 refs.]

A suprasellar tumour is described in a four-year-old terrier which during life showed polyuria, lethargy and a tendency to walk in circles. The hypophysis was found at autopsy to have been completely replaced by a tumour of very diverse histological structure which was considered to be either a teratoma or a cranio-pharyngioma.

BENGTSON, J. S. (1938). **Primary Reticulum Cell Sarcoma of the Lymph Nodes of a Cow with Widespread Metastases.**—*Amer. J. Path.* **14**. 365-376. 6 figs. on 8 plates, 1 table. [11 refs.]

This appears to be the first record of primary reticulum cell sarcoma in cattle,

although the use of suitable histological technique would probably show the condition to be not uncommon; many cases are probably recorded as lymphoid hyperplasia, lymphadenoma, pseudo-leucaemia, lymphocytoma, etc.

All the superficial lymph nodes, especially the suprascapular, were enlarged, greyish in colour and rather soft. There were secondary tumour deposits in the heart, intestines, uterus and skeletal muscles. No evidence of leucaemia was found in blood smears taken prior to slaughter. In histological sections prepared to show reticulum, almost every tumour cell was in direct contact with reticulum fibrils. The cells of such a sarcoma arise from the reticulum of lymph nodes and are not derived from lymphocytes.—E. G. WHITE.

HELMER, O. M., & CLOWES, G. H. A. (1937). **Effect of Fatty Acids Structure on Inhibition of Growth of Chicken Sarcoma.**—*Amer. J. Cancer*. 30. 558-554.

The authors found that an unsaturated fatty acid fraction of pig pancreatic juice had a strong inhibitory effect on the growth of the active agent of chicken tumour I, and oleic acid was found to have a comparable inhibitory effect. The biological properties of the fatty acids and their soaps were shown to be related to their structure. The authors then attempted to discover the relationship of the chemical configuration of a series of fatty acids to their inhibitory effect on the active agent of chicken tumour I.

Fatty acids dissolved in di-sodium acid phosphate were added to an aqueous extract of desiccated tumour I prior to injection into Plymouth Rock hens. It was shown that the straight chain unsaturated fatty acids with 18 carbon atoms had a greater inhibitory effect than a comparable saturated fatty acid. Increase in the degree of un-saturation greater than that of oleic acid did not increase this inhibitory effect, which was shown to be lessened when the acids were oxidized or reduced.

The presence of the hydroxyl group lessened the inhibitory action, which varied with the length of chain, the higher members of the series showing a much higher inhibitory action than the lower members. The inhibitory effect could only be seen when the fatty acid was in the form of a soap or in the free state.—L. E. H.

- I. FENSTERMACHER, R. (1936). **Lymphocytoma and Fowl Paralysis.**—*J. Amer. vet. med. Ass.* 88. 600-613. 8 tables. [12 refs.]
- II. GILDOW, E. M., WILLIAMS, J., & LAMPMAN, C. E. (1936). **The Transmission of Fowl Paralysis (Lymphomatosis).**—*Poult. Sci.* 15. 244-248. 4 tables. [6 refs.]

I. The author differentiates between a neoplastic disease of fowls, which he terms "lymphocytoma", and F.P., in which the lesions are confined to the nervous system and the eyes. Birds were bred from stock in which the incidence of lymphocytoma was high, and a number of these became affected with lymphocytoma. Several also developed F.P., but the author believes that the "virus" of the latter disease was introduced from outside sources. Heredity appeared to be a factor influencing the occurrence of both diseases.

II. The disease was readily transmissible by pen contact to chicks at all ages during the first eight weeks after hatching; older birds were more resistant. Chicks from healthy flocks were more susceptible than those from flocks in which F.P. was present. The disease appeared to be more prevalent in birds bred from pullets than in those bred from hens, and there was evidence of a variation of inherited resistance in certain families. There was little variation in the incidence of the disease in birds reared in a confined space and in those reared on open range. The authors conclude with some recommendations for controlling the disease—*viz.*, severe culling when disease appears, and the use of resistant strains of poultry for building up flocks.—HUGH N. SPEARS.

FITCH, L. W. N. (1988). **Fowl Leucosis : The Recognition of a Transmissible Myelogenous and Erythroleucotic Form in New Zealand.**—*N.Z. J. Sci. Tech.* 20. 40A-49A. 9 figs. [7 refs.]

F. describes a naturally occurring case of fowl leucosis. The liver and spleen were greatly enlarged and the peritoneum covered with flattened, greyish-white nodules. Histologically the tumours and affected organs showed chiefly undifferentiated myeloblasts, which were so named because many cells failed to exhibit any indication that they would develop into granulocytes.

The disease was transmitted to six-week-old chicks by intraperitoneal inoculation of liver and spleen emulsions. The presence of erythroleucosis was also demonstrated in the inoculated birds.

A. PARSONS, L. Dorothy. (1985). **Leukaemia Coincident with and Transmissible by a Spindle-Cell Sarcoma in the Mouse.**—*J. Path. Bact.* 40. 45-54. 1 text fig., 15 figs. on 5 plates, 2 tables. [8 refs.]

B. RASK-NIELSEN, H. C. (1986). Experimentelle undersøgelser over en transplantabel leukose hos hvide mus. [**Experimental Investigations on Transmissible Leucosis of White Mice**].—*Thesis, Copenhagen*. pp. 189. 89 figs. on 13 plates, 12 tables. [Numerous refs.] [Abst. from English summary].

C. RASK-NIELSEN, H. C., & RASK-NIELSEN, R. (1986-1988). **Further Investigations on a Transmissible Myeloid Leukosis in White Mice. I and II.**—*Acta path. microbiol. scand.* 13. 244-262, and 15. 169-175. 12 figs. on 2 plates, 4 tables. [Numerous refs.] [In English].

A. An account of a leukaemia in mice associated with a transmissible spindle-celled sarcoma, which originated in mice treated with a dibenzanthracene compound. The haematology of this leukaemia is described in some detail, and illustrated by some excellent plates.

The leukaemia was myeloid in character, with large numbers of pathological polymorphonuclear leucocytes. Among the cells which appeared in the circulating blood was the haemohistioblast, and P. suggests that this was the primitive cell giving rise directly to the pathological polymorphs. In this type of leukaemia in the mouse the gradation between myeloblasts and myelocytes appeared to be missing. The development of the cells seemed to be :- haemohistioblast, myeloblast, metamyelocyte, and pathological polymorphonuclear leucocyte.

B. After reviewing the literature on the subject in the first chapter of this work, the author describes in great detail his experimental results in mice when using a transmissible leucosis strain originally obtained from a mouse with tumours. The effect on the development of the disease of irradiation of the mice or their inoculation with trypanblue was studied. Complete haematological and histological examinations of most of the viscera and of the bone-marrow were also undertaken.

The histological plates at the end of the work are excellent. This thesis should be consulted in the original by those interested in the subject.

C. In part I, the authors claim to have produced a myeloid leucosis differing from those previously described by other workers in that changes occurred in the blood and bone-marrow which were not due solely to the multiplication of the inoculated myeloid cells. The only similar results are those of PARSONS [in A, above], but the leucosis described by her developed more slowly and was more in the nature of a myeloid hyperplasia than that now described, which developed from a hyper-leucocytosis to a pronounced preponderance of immature myeloid cells. The authors consider that the inoculated leucotic cells contained some agent which caused the proliferation.

Part II describes the inoculation of ten irradiated and 89 non-irradiated mice with cells obtained from myeloid leucotic material in mice killed by X-rays. It was thus hoped to demonstrate an infective agent in these cells, but the attempts failed.

Bacteriological investigation of these leucotic tumours, before treatment with X-rays, failed to reveal any organisms that might be related to the changes in the blood and bone-marrow.—D. L. HUGHES.

PANU, A., MICHAILESCO, M., & ADAMESTEANU, I. (1937). Leucemie lymphoide chronique chez le chien. [**Lymphoid Leucaemia in the Dog**].—*Arhiva vet.* 29. No. 5. 1-11. 2 figs. [In French].

The authors describe the symptoms, treatment and lesions in a typical case of chronic lymphoid leucaemia in a five-year-old dog, and then compare the relative frequency and features of the various forms of leucaemia in animals and man. Discussing the causation, they state that the toxic and parasitic theories are not applicable to the case described, and that the possibility of an infectious origin, particularly tuberculosis, was eliminated by bacteriological examinations and animal inoculation. They consider the neoplastic theory advanced by STERNBERG, *viz*, the resumption of embryonic activity by the haemopoietic tissues, as the most plausible in this case.—GWILYM O. DAVIES.

## NUTRITION IN RELATION TO DISEASE

GREEN, H. H. (1938). **The Importance of Trace Elements in Veterinary Science.**—*Vet. Rec.* 50. 1185-1191.

This is an annotation giving a review of trace elements of importance in animal and plant disease. It embraces copper, cobalt, manganese, zinc, boron, iodine, fluorine, selenium and molybdenum. It is not possible to give an abstract. —J. E.

I. EVANS, R. J., PHILLIPS, P. H., & HART, E. B. (1938). **Fluorine Storage in Cattle Bones.**—*J. Dairy Sci.* 21. 81-84. 1 table. [11 refs.]

II. EVANS, R. J., & PHILLIPS, P. H. (1938). **Skeletal Storage of Fluorine in the Growing Rat Fed Bone Meals of Varying Fluorine Content.**—*Proc. Soc. exp. Biol., N.Y.* 39. 188-191. 2 tables. [4 refs.]

I. The following average figures were obtained for the F content of bones from healthy cattle (bones not named), expressed in p.p.m. bone ash :— embryonic stage 92 ; foetus (4-9 months), 64 ; veal calves, 55 ; mature cows (reared on low F diet), 298, and bone-meal, 564. It is concluded that (a) a small amount of F passes through the placenta to the foetus, (b) the chief storage of F in the bones occurs after weaning, since while calves are being milk-fed the bone F content is relatively low, and (c) F appears to be present in appreciable quantities in the organic matrix of the bone and in cartilage.

II. Bone-meal from the metatarsals of healthy calves contained, after defatting and grinding, 20 p.p.m. F, whereas meal prepared from the bones of adult cattle contained 474 p.p.m. and two commercial samples of bone-meal similarly contained 550 and 529 p.p.m. respectively. The femurs of young rats fed for eight weeks on calf bone-meal showed a very low F content (about 44 p.p.m.) compared with those of rats fed on commercial bone-meals (average 300 p.p.m.). Some of the data obtained seemed to indicate that part of the F in calf bones was combined in such a form that it was not available for absorption and storage in the rat skeleton.

—ALFRED EDEN.

ROUGET, M. (1938). La découverte de gisements phosphatés en Afrique Occidentale Française et ses répercussions possibles sur notre élevage. [**The Discovery of Phosphate Deposits in French West Africa and its Possible Effects on Animal Husbandry**].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 1. 51-57.

The discovery of phosphatic deposits in the Sudan and around the Senegal basin opens up new possibilities in extending animal husbandry in these regions through the medium of improved pasturage. These deposits compare favourably in CaO and  $P_2O_5$  content with the French Moroccan deposits, whilst their F content, though not specifically investigated, is certainly less than 1%. Various quotations are made from official reports amplifying the view that the stock-carrying capacity of these regions could be considerably increased by improvement of the grazing areas, since the annual rainfall is adequate and not likely to be a limiting factor. R. calls for more research into the possibility of Ca and P deficiencies in the soil in these areas, and advocates:—(a) investigation of the available CaO and  $P_2O_5$  of the soil of these regions; (b) a botanical survey with a view to pasture improvement consequent upon increased CaO and  $P_2O_5$  in the soil; (c) systematic investigation of the blood inorganic P of cattle in the supposedly deficient areas; (d) analysis for possible harmful elements such as F in the deposits, and (e) experimental farm studies on the influence of Ca and P supplements on growth, fertility, etc. of cattle. The economics of working the deposits are discussed and a plea is made for a thorough survey of the potentialities attendant upon the discovery of these deposits.—ALFRED EDEN.

HUNGERFORD, T. G. (1937). **Mineral Deficiency and Bone Chewing in Dairy Cattle. Supply Licks and Improve the Pastures**.—*Agric. Gaz. N. S. W.* 48. 585-587 and 590. 1 fig.

Symptoms of phosphorus deficiency, particularly bone chewing and depraved appetite, are commonly encountered among the dairy herds on the central coastal area of New South Wales. Foreign bodies ingested as a result of the depraved appetite not uncommonly result in traumatic pericarditis and peritonitis. The article gives a popular account of the matter and advice regarding the use of superphosphate top dressing and phosphatic licks.—D. A. GILL.

ARCHIBALD, J. G., KUCINSKI, K. J., BROOKE, R. O., & FREEMAN, S. L. (1938). **Nutritional Anaemia in Cattle in Southeastern Massachusetts**.—*J. Dairy Sci.* 21. 59-68. 2 figs., 6 tables. [6 refs.]

A disease of cattle, especially young dairy stock, known locally as "neck-ail", has been described in parts of S.E. Massachusetts and is characterized by emaciation, anorexia and, apparently, anaemia with low R.B.C. count [although no data are supplied to support this]. It appears to be related to the low Fe content of the diet, the roughage in which is somewhat lower in Fe than that from neighbouring areas where the disease is unknown. Daily oral administration of 2 oz. of approximately 5% iron ammonium citrate effected a remarkable cure and the trouble was further prevented by feeding other hays not grown in the area. In a series of pot experiments with grasses grown on the supposedly Fe-deficient soils, the Fe content of the grasses was raised, on an average, from 0.027 to 0.043% by the application of a mixed complete fertilizer plus iron (as the ammonium citrate) and this addition of Fe to the soils is suggested as an alternative method for prevention of the disease. The authors claim that this nutritional anaemia of cattle is identical with that shown in various other parts of the world ("bush sickness", "pining", "nakuruitis", etc.).

[Note: The evidence on which these conclusions are based is extremely meagre. The Hb values of only four heifers were determined and these were 9.6, 8.8, 9.8 and 12.2 g. % respectively. Three of these are regarded as low, since the authors take 12.1 g. % as "normal", but a diagnosis of anaemia on these figures is extremely unsound. Insufficient is known about the Fe level in a diet required to induce a true anaemia, but the differences between the figures for hays from "deficient" areas compared with those from "healthy" areas are so small in absolute terms as not to warrant the conclusions drawn. A slight reference is made to cobalt in a brief foot-note, inserted after the paper was written, but the authors did not seem to be aware of the extensive work that has been carried out on cobalt. They still apparently regard the nutritional anaemias of other parts of the world as Fe deficiencies, regardless of the vast amount of work that has been done to show that these diseases are anything but simple iron deficiencies. The justification, therefore, for attempting to bring "neck-ail" into line with the nutritional anaemias such as "pine", "bush sickness", etc., is not warranted on the very meagre evidence submitted].—ALFRED EDEN.

EDWARDS, J. T. (1937). **Carotene (or Vitamin A) Deficiency and some Common Unsoundnesses in Horses: A Comparative Review of their Possible Relationship.**—*J. R. Army vet. Cps.* 9. 3-23 and 60-82. 24 figs. [Numerous refs.]

E. reviews the extensive literature on animal diseases arising from deficiency of carotene or vitamin A, and discusses the possible bearing of this knowledge on the aetiology of several diseased conditions in the horse. The recorded facts upon the various well recognized clinical and pathological states arising from deficiency of vitamin A in various species strongly support MITCHELL'S hypothesis on the relationship between dietary deficiency, in particular deficiency of carotene, and the common unsoundness of the horse [*V. B.* 9. 102].

The article contains numerous quotations from the literature, together with critical comments by E. Inadequate supplies of carotene in the food have been recognized as the cause of faulty hoof formation in horses in Finland [see p. 419.] and of debility in horses and mules in French Indochina [*V. B.* 4. 626].

The well marked nervous lesions known to occur in pigs and dogs as a result of vitamin A-deficiency suggest that diseases such as shivering and roaring, where there is likewise nervous degeneration, may have a similar aetiology. In the same way, from what is known with regard to other species, infertility in horses may arise from deficiency of carotene.

The possible carotene requirements of horses are discussed in the light of GUILBERT and HART'S work on cattle [*V. B.* 4. 625.] and DUNLOP'S work on pigs [*V. B.* 6. 886]. It would appear that the daily ration for horses should contain a minimum of 15 mg. of carotene, but more adequate amounts would be supplied by the grazing of 10-16 oz. of pasture grass daily. It is pointed out that hay may often be deficient in carotene, especially where the grass has been of poor quality or badly cured, and E. comments that the above requirements are frequently not met with in many of the standard feeding rations of the horse.

Other aspects of carotene deficiency discussed are resistance to bacterial and parasitic infections, growth, and derangements in the alimentary, respiratory and urinary tracts. The possible results of such depletion in pregnant mares and in foals are discussed in relation to some of the types of unsoundness in horses scheduled under the Horse Breeding Act.—N. J. SCORGIE.

CRIMM, P. D., & SHORT, D. M. (1937). **Vitamin A Deficiency in the Dog.**—*Amer. J. Physiol.* 118. 477-482. [Copied verbatim from *Physiol. Abstr.* 22. 656. Signed M. W. GOLDBLATT].

7 dogs 1 year old, of which 6 were litter mates, were used. 2 controls were fed on vitamin A-deficient diet plus 7.2 g. cod-liver oil weekly, 4 received only vitamin A-deficient diet, and one of these 4 had 2 litters of puppies which were fed their mother's milk and the A-deficient diet. One dog was killed at the beginning of the experiment and the vitamin A of the liver determined; the vitamin A content of all livers was determined at the end of 52 weeks. The deficiency of the diet was verified by feeding the same to rats, which showed a neutrophilic index lag and a weight loss or xerophthalmia, or both, within 28-35 days. A neutrophil index lag became definitely manifest in the A-deficient dogs at 8 months and persisted to 6 months. Xerophthalmia and progressive weight loss was not observed, but early metaplasia of the bronchiolar epithelium was manifest at autopsy, together with a moderate pneumonitis. Spectrophotometric assay of the livers showed essential depletion. Of the vitamin A given in the form of cod-liver oil, 44 p.c. was recovered from the liver. After the administration of a massive dose of vitamin A to A-deficient dogs, a 8-months-old puppy absorbed and assimilated 40 times as much vitamin A in the liver as did an adult dog. The vitamin A requirement in the dog was between 157 and 330 I.U. per kg. of body weight per week, and if the requirement of vitamin A for man corresponds to that of the dog, it seems that the daily requirement for a man weighing 60 kg. would be 1,800 I.U. or approximately 2 g. of cod-liver oil.

LAHIRI, L. M. (1938). **Night Blindness and Cataract in Bullocks. (A Deficiency Disease ?).**—*Indian vet. J.* 15. 58. [See also *V. B.* 9. 102].

Bullocks fed on a diet apparently deficient in vitamin A developed nyctalopia and cataract of one or both eyes. Their general condition, however, remained good. A supplement of green fodder to the grain ration together with a course of nux vomica cured the night blindness.—D. D. OGILVIE.

- I. MEYER, J. R., PAMPLONA, A., & BUENO, P. (1937). Sobre a pretendida relação entre a "arteriosclerose hiperplástica das cobaias" e a hipovitaminose C. [Relation between **Hyperplastic Arteriosclerosis of Guinea Pigs and Hypovitaminosis-C**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* 8. 37-42. 16 figs. on 4 plates, 8 tables. [5 refs.] [English summary].
- II. MEYER, J. R. (1937). Artefactos de fixação simulando "arteriosclerose hiperplástica" em cobaias. [**Artefacts Originating from Tissue Fixation Simulating Hyperplastic Arteriosclerosis in Guinea Pigs**].—*Ibid.* 43-46. 4 figs. on 2 plates. [English summary].

I. Thickening of the capillaries of the lungs, liver, spleen and kidneys is said to occur in normally fed g. pigs; it is most frequent in the lungs (about 80%), less frequent in the liver (33-50%), and exceptional in the spleen and kidneys. The authors point out the similarity of the lesions (hyperplastic arteriosclerosis) to those described by MENTEN and KING [(1935). *J. Nutrit.* 10. 129-155.] in g. pigs fed with a diet insufficient in vitamin C.

II. Formalin injections were made into the trachea and heart of g. pigs; they were then killed, and fixation of the tissues was completed in 10% formalin. On examination M. found that these tissues were free from the lesions described in I, and concludes that these lesions must be artefacts.—S. TORRES.

MAREK, J., WELLMANN, O., & URBANYI, L. (1936). Neuere Beiträge zur chemischen Zusammensetzung gesunder und rachitischen Knochen. [**Chemical Composition of Normal and Rachitic Bones**].—*Hoppe-Seyl. Z.* **240**. 208-214. [5 refs.]

Analytical data are presented for organic matter, ash,  $\text{CaO}$ ,  $\text{MgO}$  and  $\text{P}_2\text{O}_5$  of bone sections of the femurs of three young pigs, one normal, one rendered rachitic on a diet in which the proportion of  $\text{P}_2\text{O}_5$  preponderated over  $\text{CaO}$  and  $\text{MgO}$  (E.A. minus 48), and one rendered rachitic on a diet in which these two bases preponderated over the phosphoric oxide (E.A. plus 104). Ten cross-sections representing the total length of the bone were separately analysed in each case and the data are discussed in relation to distribution of minerals and variation with diet. The authors deduce that the main mass of mineral matter in bones is not, as commonly believed, in the form of a compound resembling carb-apatite, but as a mixture of  $\text{C}_{25}(\text{PO}_4)_2$  and  $\text{CaCO}_3$ .

[Apatite is a mineral of the general formula  $(\text{Ca}_x)\text{Ca}_4(\text{PO}_4)_3$  where  $x$  may be F, Cl, OH, or  $\text{CO}_3$ ; carb-apatite can also be written  $3\text{Ca}_3(\text{PO}_4)_2 + \text{CaCO}_3$  and fluor-apatite, the form supposed to occur in fluorosed bone in diseases such as "Darmous" could be written  $3\text{Ca}_3(\text{PO}_4)_2 + \text{CaF}_2$ ].—H. H. GREEN.

KLEMOLA, V. (1933). Ueber keratoplastische Reaktion der Hufhornbildung durch einige physiologische Faktoren. [**The Keratoplastic Reaction of the Hoof to some Physiological Factors**].—*Biederm. Zbl. Tierernährung B.* **5**. 657-675. 18 figs., 1 table. [Numerous refs.] [English summary].

It was observed that army horses fed for months on a dry ration of oats and hay developed hoof changes characterized by general weakness, ring formation and the formation of crumbly deposits on the limbus unguulae, particularly at the heels.

Five groups of horses were used, with control groups, to test the value of supplementary foodstuffs for improving the hoof structure. The materials used were potatoes, AIV silage, natural grazing, vigantol (vitamin D) and cod liver oil respectively. Horses on natural grazing quickly improved and developed new, strong hoof horn; those on silage and those on cod liver oil also improved considerably, whilst the vigantol group showed little improvement, and the potato group none at all.—J. E.

## PUBLIC HEALTH

Geč, M. (1938). Snabdevanje gradova mlekom u Jugoslaviji. [**How Yugoslavian Towns are Supplied with Milk**].—*Jugoslav. vet. Glasn.* **18**. 245-252.

G. discusses the milk supply of Belgrade. The population is 320,000 and the daily consumption is 72,000 litres. The milk comes from 9,000 cows belonging to 2,500 owners, mostly from the near vicinity. Though the cows are said to be healthy the hygienic conditions are unsatisfactory as to the maintenance and milking of the cows, and transport and storage of the milk. Information is given regarding the results of tests for contamination and added water.

—B. OSWALD (KRIŽEVCI).

BROWN, E. (1938). **The Tuberculosis (Attested Herds) Scheme**.—*J. R. sanit. Inst.* **59**. 451-462.

The first scheme for free tuberculin testing was introduced by the Ministry of Agriculture and Fisheries in 1935. Previous to that, notwithstanding the success

of mallein in connexion with the eradication of glanders in horses, eradication of TB. from cattle herds was considered a luxury; in the export trade its eradication by the use of the tuberculin test was a commercial factor.

The Tuberculosis Order of 1925 was introduced to safeguard the milk supply, and the Milk (Special Designations) Order (1936) encouraged milk producers to eradicate TB. from their herds. The Ministry of Agriculture's Attested Herds Scheme of 1935 was not well received, principally because no help was given to owners during the process of eradication, and after two years and four months, only 288 herds were on the register of Attested Herds in England and Wales.

Under the new scheme introduced in June, 1937, the Government contribute towards the cost of testing in herds in which there are not more than 10% reactors. The conditions are less onerous than in the earlier scheme. By April 30th, 1938, the number of herds on the register had increased to 1,350. B. considers that as the scheme develops the problem of the disposal of reactors will decrease.

—BRENNAN DEVINE.

ALLARD, E. U. (1938). *L'hygiène du lait au Canada*. [**Milk Hygiene in Canada**]. —*Lait*. 18. 813-822.

The history of milk hygiene in Canada is traced from its commencement in 1881 to the institution in certain areas of routine bacteriological examination of milk and veterinary examination of dairy herds in 1913. The unsatisfactory conditions under which milk was produced and handled prior to the commencement of this campaign of improvement are described in detail.

It is pointed out that inspectors must also be instructors and must be able to demonstrate to milk producers and distributors the methods of hygienic milk production and distribution.

Figures are given showing from how many herds the milk supply for Quebec is obtained, and the relative percentages sold as raw and as pasteurized milk respectively; the methods of control and inspection of herds and premises are described and discussed.—H. BURROW.

GILTNER, W. (1938). **The Training of Veterinarians for Milk Hygiene**.—*J. Amer. vet. med. Ass.* 93. 367-371. 1 table.

The failure of the United States Public Health Service to recognize the value of veterinarians in its public health programme is commented upon. It is suggested that as the veterinarian is regarded as insufficiently trained for the control of intricate mechanical equipment used in connexion with pasteurization and distribution of milk, further training in this work should be added to the veterinary curriculum. A questionnaire to all veterinary colleges in the U.S.A. asking for information regarding facilities offered for such training is outlined and the replies are analysed at length. These replies revealed a general agreement that better facilities in this direction are needed in order that the veterinarian may be able to take over all control of dairy hygiene. The need for refresher courses open to those who have been qualified for some years is also indicated.—H. BURROW.

GRACE, L. B. A. (1938). **Thoughts on Meat Inspection Suggested by Smithfield Experience**.—*J. R. sanit. Inst.* 59. 436-450.

The low incidence of disease found in imported meat is attributed to the efficiency of meat inspection in exporting countries, to the low incidence of disease among animals in those countries and to the effect of check-inspection in the importing country.

The problem of inspection of imported boneless beef and veal and of the determination of immaturity in veal is discussed at some length. Taints in imported meat and their origin are mentioned.

The urgent need for routine examination of poultry carcasses, especially for the presence of tuberculosis, is illustrated by figures showing the extent to which disease may be found in apparently well-nourished hens when routine examination is carried out. The condemnation of poultry carcasses affected with avian TB. is justified.

A strong plea is made for uniformity of meat inspection throughout the country, controlled either by a central authority or by grouping of local meat inspection authorities for this purpose.—H. BURROW.

KNOTH, M. (1938). Ueber bakteriologische Fleischuntersuchung bei Schweinepest. [**Bacteriological Meat Inspection for Swine Fever**].—*Z. Fleisch- u. Milchhyg.* 48. 265-267. [17 refs.]

Under German meat inspection regulations, S.F. carcasses may be passed for human consumption after boiling or cooking, provided no *Salmonella cholerae-suis* have been found at bacteriological meat inspection. At present, however, S.F. carcasses are not always submitted to bacteriological inspection, and K. emphasizes that this should be done, as reports of this organism causing disease in human beings are received.—M. F. BENJAMIN.

LANGPAP, A. (1938). Stimmen für und gegen die Anreicherung in der bakteriologischen Fleischuntersuchung. [**Reasons For and Against Bacteriological Enrichment Methods at Meat Inspection**].—*Münch. tierärztl. Wschr.* 89. 133-136. [13 refs.]

L. describes the method used in the Munich abattoir for the bacteriological inspection of meat. The best results are obtained by using a fluid bile-broth malachite-green medium, and incubating for six hours, sub-cultures then being made on agar plates.—M. F. BENJAMIN.

## THERAPEUTICS

WHITBY, L. (1938). **Chemotherapy of Bacterial Infections**.—*Lancet*. 235. 1095-1108. 3 figs., 3 tables. [Numerous refs.]

The original prontosil discovered by DOMAGK is now rarely used. Its chemotherapeutic activity is to a great extent due to the reduction product sulphanilamide, which is fortunately not covered by patent rights: this has allowed of free and extensive investigation and progress, in an attempt to improve the parent substance. Three groups of substances are of interest, *viz* :- (1) those in which substitution has been made in the amino group, *e.g.* sulphamido-chrysoidine, prontosil soluble, proseptasine and soluseptasine; (2) those in which one hydrogen atom of the sulphamido group has been substituted, *e.g.*, uleron; M & B 693, etc., and (3) compounds of the sulphone type which are chemically unrelated to the sulphonamides; these exhibit activity but are toxic. Group (1) is effective against haemolytic streptococci, meningococci and gonococci; group (2) is effective against these bacteria and also against pneumococci. Activity is assessed either experimentally on mice or by clinical trial in human disease. The acute phases of serious generalized infections are the most amenable to treatment (which should be given early). There is no justification for giving a prolonged course. Toxic symptoms are, as a rule, not serious.

Sulphanilamide is rapidly absorbed, and produces an effective level in the blood, cerebrospinal fluid, tissues and fluids, and in foetal tissues in the pregnant animal. It is completely excreted in the urine in 24 hours, and the effect of one dose persists for about six hours. Treatment produces some degree of acidosis, and sulphaemoglobinaemia and methaemoglobinaemia are common. Agranulocytosis, anaemia and exfoliative dermatitis are rare. The rational use of sulphanilamide demands a bacteriological as well as a clinical diagnosis. In severe meningococcal infections it appears desirable to combine the drug with serum treatment. In Great Britain sulphanilamide is preferred to uleron, which is favoured in Germany, in the treatment of gonorrhea; 10-20% of the patients fail to respond to the treatment. Sulphanilamide is effective in non-venereal infections of the genital-urinary system, especially with *Bact. coli* infection. It has some action against staphylococcal infections and gas gangrene, and its use in a large number of other conditions is under investigation. The benzyl compounds prosectasine and soluseptasine are less toxic and are probably of use in the less severe infections with haemolytic streptococci. Uleron tends to produce polyneuritis, and is recommended only in sulphanilamide-resistant cases of gonorrhea. M. & B 698 is effective in pneumococcal pneumonia, septicaemia and meningitis; it appears to have an action on *Streptococcus viridans*. Its toxicity is low, but it produces cyanosis, nausea and vomiting.

Many theories have been advanced to account for the mode of action of these drugs. They are effective *in vitro* under suitable experimental conditions. They are not leucocytic stimulants and are not specifically concerned with the immunity mechanisms. Hence it would be unwise not to use them in combination with immunological therapeutic measures. There is a delay of several hours in the action of these drugs both *in vitro* and *in vivo*, and it is the multiplication of organisms which is essentially interfered with. It is suggested that these drugs block some "receptor" part of the bacterium, so that it cannot properly use essential foodstuffs. The possibility that resistant strains of bacteria may evolve is discussed.—J. M. ROBSON.

- (1938). **Discussion on the Treatment of Acute Streptococcal Infections.** [Speakers:—DYKE, S. C., LAYTON, T. B., KENNY, Meave, CLELAND, J. B., & BUTTLE, G. A. H.]—*Proc. R. Soc. Med.* 31. 731-736.

This discussion was mainly on the value of sulphanilamide and the opener, Dr DYKE, stated that its value is undoubted, but that there still remains the problem of the best type of compound to use and the best method of employment. Administration by the mouth is as effective as any other method. Possible undesirable effects include sulphaemoglobinaemia, methaemoglobinaemia, pyrexia, the development of a rash, and granulocytosis; of these, only the last is very serious. The aim of treatment is not to destroy all haemolytic streptococci in the tissues of the body, but to sway the tide of battle in favour of the natural bactericidal forces in the body. Other contributors to the discussion pointed out that it had not been proved that sulphanilamide has any effect on infection in tissues as distinct from that in the blood stream, and that early bacteriological investigation, and adequate and sometimes prolonged administration of the drug, are essential.—W. J. IRONSIDE.

- ANON. (1938). **Progress in Chemotherapy.**—*Lancet*. 235. 1245-1246. [3 refs.]

The relative merits of sulphonamide, M & B 698 and uleron as chemotherapeutic remedies are discussed. Evidence is accumulating that M & B 698 is the most promising drug in the treatment of pneumococcal pneumonia, and that it is valuable for gonorrhoea, since there is no need for treatment to be held up until

the infection has elicited a response from the bodily defence mechanism, as is the case with sulphanilamide. Some observers have failed to confirm the satisfactory results with uleron reported from Germany. M & B 693 has been used successfully in the treatment of meningococcal meningitis.—J. M. ROBSON.

ANON. (1988). '**Prontosil**'. **A Survey of the New Chemotherapy**. pp. 71. [Numerous refs.] London: Bayer Products Ltd. [8vo].

This publication does not lend itself to abstraction, as it is itself built up from some 200 references relating to pharmacology, toxicology and clinical experiences.

—W. J. IRNSIDE.

BAUER, H., & GUNDERSON, M. F. (1988). **The Effect of Sulfanilamide on the Streptococci in the Udder of Mastitis Cows**.—*J. Bact.* 36. 567.

Eight animals affected with mastitis were treated with doses ranging from  $\frac{1}{2}$  oz. to 16 oz., and it was found that the streptococcal count in the milk was reduced as long as the drug could be detected in the milk, but rose again when the milk was free from the drug.

One of the animals was infected with staphylococci, and in this animal the treatment had no effect.—W. J. IRNSIDE.

BEVAN, L. E. W. (1987). **Abortus Fever: Some Notes from Southern Rhodesia. Treatment of a Human Case with Prosepticine**.—*J. comp. Path.* 50. 338-344. 1 chart. [10 refs.]

The article begins with a few notes on bovine brucellosis in Southern Rhodesia; this disease was once on the Schedule of Infectious Diseases, but was eventually removed. B. refers to a vaccine prepared from massive cultures of *Br. abortus* attenuated by exposure to chloroform, and which gave good results in some instances, but not regularly.

Human infection was once frequent in Southern Rhodesia, but the incidence has declined recently, and B. thinks that the population must have acquired an immunity, as bovine abortion is still prevalent. He describes a case of brucella infection in a child who drank unboiled milk from an infected herd while in a weak state of health after measles. After grave illness, recovery followed the administration of prosepticine.

I. LEVADITI, C., & VAISMAN, A. (1987). **Chimiothérapie antiendotoxique. [Anti-Endotoxic Chemotherapy]**.—*C. R. Acad. Sci., Paris.* 205. 1108-1110. [5 refs.]

II. LEVADITI, C., & VAISMAN, A. (1988). **La chimiothérapie antiendotoxique et son mécanisme. [The Mechanism of Anti-Endotoxic Chemotherapy]**.—*C. R. Soc. Biol. Paris.* 128. 469-465. [4 refs.]

I. The authors found that certain aromatic sulphonated derivatives, as for instance, diaminodiphenylsulphone, dioxydiphenylsulphone, diacetyldiaminodiphenylsulphoxide, and especially, 4-nitro-4'aminodiphenylsulphoxide, had a curative effect on experimental gonococcal infections in g. pigs, and that the action of the drugs was both antibacterial and anti-endotoxin.

To establish the anti-endotoxin action of 4-nitro-4'aminodiphenylsulphoxide they injected concentrated, centrifuged emulsions of killed gonococci into g. pigs intraperitoneally, and simultaneously gave the drug *per os*. They inoculated 8 mg. of dried endotoxin into five control g. pigs and into ten others which had also received 8 mg. of the drug; the controls all died within 24 hours, whereas three of the treated animals survived. In another experiment, 2 mg. of endotoxin

and 5 mg. of the drug were inoculated into 20 guinea pigs; ten controls were all dead after two days, but 12 of the treated animals survived. In a third experiment, 1.5 mg. of endotoxin and 5 mg. of the drug were given to 20 guinea pigs; after seven days, two controls survived out of 20, whereas 11 of the treated animals survived.

The authors conclude that the action of this and similar drugs is antibacterial and anti-endotoxic. They also found that the control mice which survived the injections of gonococci acquired an immunity, whereas the mice treated with the drug did not acquire any immunity.

II. The possibility of an action similar to that described in I has also been demonstrated in the case of the endotoxins of meningococci, *Pasteurella aviseptica*, and *Salmonella typhi-murium*. This article reports similar experiments with *Bact. shigae* and *Bact. flexneri*. The compounds used were 4 nitro-4'aminodiphenylsulphoxide, 4 nitro-4'aminodiphenylsulphone, p-aminophenylsulphamide, and the sodium salt of 4'sulphamidophenylazo-3.5-diaminobenzoic acid. Experiments similar to those described in I [p. 423] showed that 4 nitro-4'aminodiphenylsulphoxide was the most effective of the drugs used. This drug had the same effect whether it was administered subcutaneously or *per os*.

In a further series of experiments the authors found that the action of 4 nitro-4'aminodiphenylsulphoxide, p-aminophenylsulphamide, and of hydroquinone on the endotoxin of *Bact. shigae*, and of hydroquinone on the endotoxin of gonococci, was not produced *in vitro*. They conclude that these compounds are only effective after having undergone certain undefined modifications within the organism.

HOLTH, H., & RØKKE, B. (1938). Serumbehandling ved føllsyke. [Serum Treatment of Navel-ill in Foals].—*Norsk VetTidsskr.* 50. 170-175.

During the years 1938 to 1937, P.M. examinations were carried out on 44 foals, and in 65% the cause of death was navel-ill. MAGNUSSON informed H. that in an observation in Sweden 75% of 314 foals were so affected.

During the same period a Swedish brand of polyvalent joint-ill serum was tried against the disease in Norway, both as a prophylactic and a cure. In several cases the serum treatment proved beneficial, but in others it was useless.

—GUSTAV NAERLAND (OSLO).

BENESCH, F. (1938). Zur intravenösen und subkutanen Mutterblutbehandlung beim Fohlen (Fohlenlähmeprophylaxe). [Treatment of Foals with Joint-ill by Transfer of Maternal Blood].—*Wien. tierärztl. Mschr.* 25. 238-240. [1 fig.]

As a practicable clinical procedure, amounts of maternal blood up to 700 c.c. can be administered to the foal within 6-7 minutes; the apparatus used is described.—A. T. PHILLIPSON.

MENK, W. (1937). Zur Therapie und Prophylaxe der seuchenhaften Encephalomyelitis der Pferde in Argentinien. [Treatment and Prevention of Equine Encephalomyelitis in Argentina].—*Festschrift Bernhard Nocht, 1937.* pp. 309-322. 3 tables. Hamburg: Friederichsen, de Gruyter & Co. [In German].

M. states that he obtained good results in the treatment of E.E. with hexamethylenetetramine. [Reports on the curative effect of this drug have been made before. There appears to be little ground for such claims].

Experiments on g. pigs and rabbits showed that these animals, which are highly susceptible to equine encephalomyelitis virus when young, were effectively

immunized by injection of the blood or serum, and still more so by injection of 1 or 2 c.c. of a formol vaccine prepared from the brains of g. pigs or rabbits experimentally infected with the virus. Immunity was established as early as ten days after injection, and it is reported that the vaccine will preserve its activity for at least seven months when kept on ice.

MARCUS, P. M., & NECHELES, H. (1938). **Treatment of Spontaneous Canine Distemper with Sulphanilamide.**—*Proc. Soc. exp. Biol., N.Y.* **38**. 385-387. 1 table. [3 refs.]

Treatment was given on the grounds that in distemper superimposed infection is more fatal than virus infection, and that in many fatal cases streptococci are the prevailing organisms present.

Sulphanilamide was given *per os* in doses of 0.33 g. thrice daily, followed up by subcutaneous injection of 100 c.c. of a 1% solution in saline, with 5-10% glucose when necessary, twice daily. Prontosil was given twice daily in intramuscular doses of 1 c.c. of a 5% solution per kg. body weight. Treatment was given when nasal discharge was observed and continued until it ceased, this period varying from 8 to 18 days. Relapses occurred when treatment was discontinued before nasal discharge had ceased.

Of 17 animals treated, 16 recovered, while only two out of 20 controls recovered.

—W. J. IRNSIDE.

— (1938). **Discussion on Mineral Salts in Therapy.** [Speakers:—McCANCE, R. A., AITKEN, R. S., & COPE, C. L.]—*Proc. R. Soc. Med.* **31**. 723-730. [6 refs.]

The opener of the discussion, Dr McCANCE, dealt with the rationale underlying treatment with sodium chloride. The metabolism of sodium is closely linked with that of water. The osmotic tension of intracellular fluids is largely due to potassium salts, and that of extracellular fluids to sodium salts.

Simple removal of water from the body results in a rise in the osmotic tension of both fluids and interferes with the exchanges that take place between blood and tissues. The condition may be corrected by administration of water alone. Where sodium is removed the body may (1) excrete water and so maintain the osmotic tension of extracellular fluid, but reduce its volume, (2) maintain the volume of fluid and allow the osmotic tension to fall (sometimes seen in the rabbit), or (3) compromise between (1) and (2), which is what happens in man and most animals.

Correction of this sodium deficiency necessitates the administration of saline. Where sodium is not excreted the volume of extracellular fluid rises and causes oedema, and this is corrected by the removal of sodium. Diuretin appears to act by forcing the kidney to excrete sodium. Other speakers drew attention to the value of potassium salts in the treatment of periodic paralysis, and to the possible toxic effects of calcium chloride, potassium chloride, and salts of magnesium.

—W. J. IRNSIDE.

DE GIROLAMO, A. (1937). Tentativi di cura del farcino criptococcico mediante l'impiego del solfuro di mercurio o mercol. [**Chemotherapy of Epizootic Lymphangitis**].—*Profilassi*. **10**. 9. [2 refs.] [German summary].

The author describes the treatment, with a commercial colloidal mercury-sulphur preparation known as "Mercol", of two horses with epizootic lymphangitis (*Cryptococcus farciminosus* infection). The results were unsuccessful.—S. F. J. H.

DICKINSON, E. M., & HINSHAW, W. R. (1988). **Treatment of Infectious Sinusitis of Turkeys with Argyrol and Silver Nitrate.**—*J. Amer. vet. med. Ass.* **93**, 151-156. 1 fig., 1 table. [5 refs.]

The authors carried out trials on an extensive scale and found that treatment was effective when either 4% silver nitrate or 15% argyrol was used. They recommend that the solutions should be freshly prepared. The treatment consisted of aspiration of the contents of the sinus followed by the injection of 1 ml. of the solution. They advise treating both sinuses even if only one is affected.—W. J. I.

HELM, R. (1987). Versuche mit dem Melkgleitmittel Weidnerit-Gel zur Verhütung der Weiterverbreitung des gelben Galtcs. [**The Use of the Milkers' Ointment, Weidnerit-Gel, in Preventing the Spread of Mastitis**].—*Arch. wiss. prakt. Tierheilk.* **72**, 131-141. 2 tables. [17 refs.]

An account of the use of the product on two herds of cattle. No evidence was produced concerning its value.—J. E.

FARINA, A. (1987). Saggi sull'azione svolta dal tartaro emetico e dal trattamento associato di gonacrina e tripanblau sul *Trypanosoma cazalbou* nei hovini della colonia Eritrea. [**Action of Tartar Emetic and of Gonacrine with Trypanblue on *Tryp. vivax (cazalbou)* in Cattle in Eritrea**].—*Azione vet.* **6**, 210-211.

F. treated calves, infected with *Tryp. vivax (cazalbou)*, with intravenous injections of tartar emetic [details as to dosage not given]. In every case the results were negative. The injections caused a temporary disappearance of the trypanosome, but it reappeared after an interval of 8-15 days. Moreover, blood taken from a treated animal proved infective to other animals. Further treatments were carried out with injections of gonacrine plus trypanblue on animals infected with trypanosomiasis and also with rinderpest [no details as to dosage]. The results were again negative.—S. F. J. HODGMAN.

MORRELL, C. A., CHAPMAN, C. W., & ALLMARK, M. G. (1988). **On the Therapeutic Assay of Neosarsphenamine with *Trypanosoma equiperdum*.**—*J. Pharmacol.* **64**, 14-42. 1 fig., 5 tables. [14 refs.]

The authors describe an improved method of assaying the therapeutic potency of neosarsphenamine by means of dosage-response curves. White rats 80-120 days old were infected with two million *Trypanosoma equiperdum* each, and after 48 hours were treated with neosarsphenamine. Results were obtained five hours after injecting the drug.

The carefully standardized technique eliminates certain errors due to variation of the experimental factors. A detailed report is given of the application of the test to several commercial samples of neosarsphenamine in which the accuracy and utility of the test were demonstrated.—D. D. OGILVIE.

BINNS, H. R. (1988). **The Treatment of Canine Babesiosis with Acaprin.**—*Vet. J.* **94**, 425-429. [4 refs.]

Thirty cases of *Babesia canis* infection were treated with acaprin. Each dog received a single subcutaneous injection of 0.1 c.c. of a 0.25% solution of the drug per kg. body weight. Most cases were much improved within 24 hours, and all recovered eventually. In 17 of the dogs, characteristic symptoms of therapeutic reaction were observed 15-30 minutes after injection, but the animals were normal again within an hour. Such symptoms emphasize the narrowness of the margin between the curative and toxic doses of acaprin.—D. D. OGILVIE.

O'GORMAN, C. L. (1938). **Repeated-Arsenical Dipping of Sheep.**—*Aust. vet. j.* **14.** 68-69.

In a district where repeated dipping of sheep at 14-day intervals in a solution of 8 lb. arsenious oxide to 400 gallons of water was necessitated through regulations concerning eradication of the cattle tick (*Boophilus australis*), it was found that no harm resulted to the sheep. Sheep of all ages were dipped, from lambs one week old upwards. There was apparently no adverse effect upon the wool.—D. A. GILL.

ROBERTS, F. H. S., & LEGG, J. (1938). **Nicotine Sulphate : Its Use in the Treatment of Cattle Lice.** (*Haematopinus eurysternus* Nitzsch).—*Aust. vet. j.* **14.** 58-60. 1 table.

Nicotine sulphate at the rate of 5 ml. of a 40% solution per gallon of water was very effective against *H.e.*, practically all the lice being destroyed. Lice were killed soon after being wetted with the spray, and the only survivors were those hidden in folds of skin. This treatment was not very efficient against the eggs, and it appears necessary to repeat treatment after 14 days to effect complete eradication. The treatment was harmless to the animal whether in shade or exposed to sunlight. Owing to its cost, however, its use will probably be limited to dairy cattle and stud animals. Certain difficulties in treatment of herd animals in large numbers out in the open are discussed.—H. McL. GORDON.

GRAHAM, N. P. H. (1937). **Observations on the Enema Treatment for Oesophagostomum columbianum.**—*Aust. vet. j.* **13.** 252-254. [2 refs.]

A field trial indicating the efficacy of the enema treatment against *O.c.* is briefly described. Treatment was carried out in early winter and sheep were then placed in paddocks which had not recently been used for sheep.—H. McL. GORDON.

PETROV, A. M., & GAJBOV, A. D. (1937). Opyty profilaktičeskoj (preimaginalnoj) degel'mintizacii krupnogo rogatogo skota pri teljazioze. [**Prophylactic Anthelmintic Treatment of Cattle against Thelazia**].—*Sovyet. Vet.* No. 4. pp. 58-61.

Observations in Azerbaijan and elsewhere showed that infection of the conjunctiva of cattle by *Thelazia rhodesi* is seasonal, being absent in March, April, and May, and beginning in June; in August and September the incidence rises until it is nearly 100%. Irrigating the eye with a 3% boric acid solution on a single occasion in July had little effect; repeated a month later it is said to have reduced the infection by 63%, and repeated in the third month it reduced the infection by 85%. The authors consider that three such treatments, beginning in June, should be adopted as a routine measure for affected cattle.

DAVIS, G. K., & MAYNARD, L. A. (1938). **Cod-Liver Oil Tolerance in Calves.**—*J. Dairy Sci.* **21.** 143-152. 2 tables. [14 refs.]

Dairy calves were reared from birth on skim milk, hay and a concentrate mixture, with cod liver oil added at various levels up to 0.7 g. per kg. body weight. These calves were killed off at 6 or 9 months of age and examined for gross and microscopical lesions. The cod liver oil when at the highest levels did not adversely affect growth or physical condition, and the same results were obtained when the experiment was repeated using a poorer quality of hay. Slight dystrophic changes were found in some of the animals on histological examination of the muscles, principally in those animals which had received the highest amount of cod liver oil feeding, but these lesions were of a very minor character. The results suggest that cod liver oil, as an adequate source of vitamins A and D, can be fed to calves

without producing any appreciable injury, in contrast to previous findings that cod liver oil fed to sheep and goats at similar levels resulted in death accompanied by wide-spread and severe lesions.—ALFRED EDEN.

FOGGIE, A. (1938). A Note on the Treatment of Fowl Paralysis by Wheat Germ Oil.—*Vet. Rec.* 50. 1594.

Fifty chickens of a flock of 96, in which F.P. had been diagnosed, were given four injections of wheat germ oil at intervals of a week. Subsequently 16.8% died of fowl paralysis, while 8.7% of untreated animals of the flock died.—D. D. O.

## POISONS AND POISONING

DANCKWORTT, P. W., & GABEL, W. (1937). Porphyrinuntersuchungen im tierischen Harn zum frühzeitigen Erkennen von Bleivergiftungen. [Tests for Porphyrinuria for Early Diagnosis of Lead Poisoning].—*Dtsch. tierärztl. Wschr.* 45. 605-606.

In 1929, the authors' department, the Chemical Institute at Hanover Veterinary College, was requested by the German government to investigate all possible cases of lead poisoning in animals in Germany. As part of this work a method of early diagnosis was evolved, based on the detection of coproporphyrin III in the urine. 100 c.c. of urine are made acid by the addition of acetic acid, extracted with ether, the ethereal layer washed with water, and the contained porphyrin extracted with 5% HCl. The strength of red fluorescence emitted by the porphyrin in the HCl on exposure to ultra-violet light is then estimated in a Pulfrich photometer.

In this way the normal porphyrin content of equine urine was determined as 6.8γ ( $6.8 \times 10^{-6}$  g.) per 100 c.c. Only one case of lead poisoning has as yet been investigated in this way: a horse with "slight but acute" lead poisoning gave twice the above figure.—J. E.

SEEKLES, L., & SJOLLEMA, B. (1937). Der Einfluss neuro-vegetativer Gifte auf die Herzwirkung des Rindes. II. Mitteilung. Das K/Ca-Verhältnis des Blutserums im Zusammenhang mit dem neuro-vegetativen Zustand im Herzen. [The Effect of Sympathetic Nervous Poisons on the Heart Action of Cattle. II. The Connexion between the Potassium-Calcium Content of the Blood and the Sympathetic Nervous Condition of the Heart].—*Arch. wiss. prakt. Tierheilk.* 72. 191-194. 1 fig., 2 tables. [5 refs.]

SEEKLES, L. (1937). Der Einfluss neuro-vegetativer Gifte auf die Herzwirkung des Rindes. III. Mitteilung. Die Wirkung des Pilocarpins, Physostigmins, Atropins, Ergotamins und Pituglandols bei normalen Kühen und Kälbern. [The Effect of Sympathetic Nervous Poisons on the Heart Action of Cattle. III. The Action of Pilocarpin, Physostigmin, Atropin, Ergotamin and Pituglandol on Normal Cows and Calves].—*Ibid.* 195-203. 4 figs. [See also *V. B.* 8. 808].

II. Investigations were carried out on cattle (normal, gravid, hypocalcaemic and hypercalcaemic) to ascertain possible relationships between the K/Ca ratio in blood serum and the tonus of the autonomic nervous system, particularly in relation to cardiac effects. In general high K/Ca values were associated with increased parasympathetic tone, but no absolute correlation could be observed.

III. The cardiac effect of drugs affecting the autonomic system—adrenalin, pilocarpine, physostigmin (eserine), atropine, ergotamin and pituglandol—was studied on cattle. The conclusion is drawn that the autonomic relationships are

quantitatively, and probably qualitatively, different in the bovine as compared with the human subject. Intravenous injections of 50-750 mg. of pilocarpine produced no reduction of cardiac frequency in adult cattle. Small doses of eserine sulphate produced slight lowering of frequency, probably attributable to para-sympathetic stimulation; larger doses had little effect although respiratory symptoms (dyspnoea) were shown; very large doses aggravated these symptoms with considerable increase in heart frequency. High doses of atropine increased frequency with accompanying respiratory symptoms. The effects of ergotamin tartrate suggested a relative increase of sympathetic tonus and decrease of para-sympathetic. Pituglandol effected prolonged depression of cardiac frequency, suggesting paralysis of both innervation systems.—H. H. GREEN.

MOXON, A. L. (1988). **The Effect of Arsenic on the Toxicity of Seleniferous Grains.**—*Science*. 88. 81. [5 refs.]

Previous investigations had shown that in comparing the relative toxicities of such elements as Se, Te, As, V, Ni, W and Mo, only Se at the concentrations employed caused severe liver lesions in rats. More recent work has shown that feeding As along with seleniferous grains (containing organically combined Se) prevents the characteristic symptoms and lesions in rats and this protective action applies equally to inorganic Se salts. Naturally, the feeding of As to livestock as a protection against Se poisoning is not recommended on the basis of these findings, but the favourable results obtained with As have stimulated the search for other, non-toxic, elements or compounds which will similarly act protectively, and certain such compounds have already given promising results.—ALFRED EDEN.

HANLON, G. (1988). **Creosote Poisoning of Cattle.**—*Aust. vet. J.* 14. 78. [1 ref.]

H. investigated losses amongst cattle occurring in a small paddock in which electric light poles had been recently erected. Creosote had been applied to the poles while they were lying on the ground and was re-applied to them after erection. Symptoms were rapid respirations, evidence of burning on the mouth, contracted pupils and blackened faeces. There was great thirst and pain. Autopsy performed on an advanced case showed the abomasum to contain a black, oily substance which was also present throughout the intestine, accompanied by an acute gastro-enteritis.

—D. A. GILL.

WEBB, J. L. (1988). **Grass-Sickness may be Matricariasis Equorum.** [Correspondence].—*Vet. Rec.* 50. 1129-1180.

W. suggests that grass sickness may be intoxication by *Matricaria suaveolens*, which he noticed was abundant on Scottish farms where the disease occurs. He was struck with the similarity between the symptoms of grass sickness and those of *M. nigellaefolia* poisoning of cattle in South Africa.—J. E.

NADAUD, M. (1988). **L'acide cyanhydrique dans les plantes fourragères. Étude chimique et toxicologique.** [Chemical and Toxicological Study of Hydrocyanic Acid in Forage Plants].—*Thesis, Toulouse*. pp. 91. 1 fig., 2 tables, 8 charts. [Numerous refs.]

This study is divided into three sections :—

(1) The classical work dealing with the discovery of HCN, and the hypotheses on its origin in plants. HCN seldom exists in a free state in the vegetable kingdom, but usually in the form of a glucoside from which it may arise in the normal or abnormal metabolism of the plant.

(2) The methods adopted for the qualitative and quantitative determination of HCN. The author used micro-sodium papers for qualitative detection.

(8) A review of the published work on cyanogenetic plants together with N's own results on HCN estimation in forage plants of the orders Leguminosae and Gramineae.

The majority of the plants studied do not contain HCN in sufficient amounts to cause any trouble to animals eating them. Some plants, however, including white clover (*Trifolium repens*), cultivated vetch (*Vicia sativa*), lotus (*L. corniculatus*), sorghum (*S. vulgare*) and blue grass (*Molinia coerulea*) may at certain stages of growth contain significant amounts, which under certain circumstances may prove dangerous to animals. Whilst HCN is present in small amounts in the male inflorescence of maize, N. asserts, on the strength of evidence he collected, that the depression in milk yield which often follows the feeding of large amounts of maize cannot be attributed to its HCN content.—N. J. SCORGIE.

SCHWERDT. (1986). Erkrankungen mit Todesfällen bei Schweinen durch Verfütterung von türkischen Erbsen? [Deaths in Pigs Fed on *Vicia ervilia*].—*Berl. tierärztl. Wschr.* 52. 767.

A report of sudden deaths in half-grown pigs fed on a mixture containing about 5% of the vetch, *V.e.* In a discussion of the toxicology it was stated that HCN was not involved, and that the true nature of the toxic principle is unknown. —J. E.

EARLE, K. V. (1938). Toxic Effects of *Hippomane mancinella*.—*Trans. R. Soc. trop. Med. Hyg.* 32. 363-370. 2 plates. [20 refs.]

A botanical description is given of *H.m.* (the manchineel tree) which is distributed along the coast-line of parts of South America, Central America and the West Indies, and which contains an active and toxic principle in the latex in the form of a resin, insoluble in ether and alcohol. Among the toxic symptoms caused in man and animals are included irritation and vesicle formation of the epidermis and genitalia, conjunctivitis, irritation of the gastro-intestinal tract, leading to colic, bloody diarrhoea, and inflammation of the respiratory tract; fatal results sometimes follow. Possible allergic reactions are discussed, but more research is required into these aspects, and suggestions are made for the prevention of accidental poisoning.—ALFRED EDEN.

## PHYSIOLOGY

RATHNOW, H. D. (1988). Ueber das Verhalten des Eisens der Nahrung während der Pansenverdauung des Schafes. [The Role of Iron during Rumen Digestion in Sheep].—*Inaug. Diss., Munich.* pp. 81. 11 tables. [Num. refs.]

The object of this work was to determine the fate of the iron of the food during the course of digestion in the rumen, and to find whether the iron content of the rumen ingesta indicates the rate of digestion. The iron and nitrogen contents of the dry matter and liquid filtrates of the rumen ingesta were estimated at 3-, 6- and 9-hour intervals after a feed of hay. The rumen content became very much diluted during the course of the nine hours' digestion: the iron and nitrogen contents of the dry matter showed a consistent rise; the iron content of the filtrates remained constant, indicating that no iron was going into solution, but the nitrogen content showed a tendency to rise; this may have been due to the nitrogen content of the saliva and/or to nitrogen going into solution.

The rise of the iron content of the rumen dry matter serves as a good indication of the rate of digestion; it is estimated by this means that in 3 hours 82.1%, in 6 hours 48.5%, and in 9 hours 58.8% of the dry matter of the rumen is digested.

—A. T. PHILLIPSON.

WATZKA, M. (1988). Schilddrüsenveränderungen unter Temperatureinflüssen. [**Changes in the Thyroid due to Temperature**].—*Tierärztl. Mitt.* **19**, 828-825. 4 figs.

During the summer the thyroid contains large follicles filled with colloidal material rich in thyroxin which are bounded by a thin layer of secretory cells. In winter the cells enlarge and the follicles almost entirely disappear. This winter change is not observed in animals which hibernate, yet in a hedgehog kept in a cold room during winter without hibernating the active type of winter thyroid was observed. Foetuses *in utero* and birds in the egg have the summer type of thyroid; the winter type of active thyroid develops rapidly immediately after birth.

The activity of the thyroid apparently depends on the temperature in which the animal lives. If this is high, the thyroid becomes less active and secretes largely into the follicles; the rate of metabolism is decreased and the body produces less heat. If the temperature of the habitat is low, the reverse occurs. During hibernation the rate of metabolism is low, as indicated by the existence of the summer type of thyroid. In the case of the hedgehog mentioned above the necessity of maintaining a normal rate of metabolism, together with normal body temperature in cold surroundings, was met by an increase in activity of the thyroid.—A. T. P.

STEGER, G. (1988). Zur Biologie der Milz der Haussäugetiere. [**Biology of the Spleen of Domestic Mammals**].—*Dtsch. tierärztl. Wschr.* **46**, 609-614. 2 figs. [7 refs.]

The size of the spleen in proportion to the body and the amount of muscle in the capsule and trabeculae appear to determine the amount of blood which the spleen can store. The spleen of young animals is proportionally larger than that of old animals; carnivores have relatively larger spleens than herbivores, with the exception of the horse, while race horses have larger spleens than other horses. The proportion of contractile tissue in domestic animals rises in the following order:—cow, pig, sheep, cat, dog and horse.

The proportion of white pulp to contractile tissues measured in volumes % in the domestic animals is as follows:—horse, 4.29 to 19.8; cow, 20.27 to 5.10; sheep, 28.78 to 6.9; pig, 10.66 to 6.40; dog, 8.01 to 16.78; cat, 8.88 to 6.99, and rabbit 85.28 to 1.01. The question of the spleen having endocrine activity is considered. Experiments are quoted connecting the spleen with tissue respiration ("respiratorische Stoffwechsel"), the respiratory centre, the coagulation time of the blood, and digestion in the stomach and intestines. The article deals also with the recognized anatomy and physiology of the spleen.—A. T. PHILLIPSON.

HAYDEN, C. E. (1988). **Changes in the Blood of the Cow at Parturition**.—*Cornell Vet.* **28**, 152-160. 6 tables. [14 refs.]

The inorganic, lipid, total acid-soluble, and total P values of the serum obtained from 11 cows shortly after parturition showed very little deviation from similar data obtained from eight normal non-pregnant cows. The work of others is reviewed and indicates that Ca and inorganic P tend to fall slightly at parturition, an observation not substantiated by the results presented in this paper. [It should be noted that the samples analysed here were obtained, some a few hours, and some 1-2 days, after parturition, and none actually just before or at parturition, so that the data are not strictly comparable with others reviewed in the literature].

In eight cases of milk fever all the P partitions were lower than normal, while the highest serum Mg figure obtained from any case of milk fever was 8.81 mg. %, being 9% higher than the high normal of 8.5 mg. % as given by EVELETH [*V. B.* **8**, 181].—R. ALLCROFT.

SUTLIĆ, A. (1938). Sadržaj karbamida u krvi svinja. [Blood Urea in Pigs].—*Vet. Arhiv.* 8. 592-598. [1 ref.] [German summary].

The urea content of the blood of 100 pigs was estimated by the Hüfner-Ambard-Hallion method using the Kowarski urometer. The average was 9,864 mg. % and the highest 81,972 mg. %. There was no evidence of any connexion between the blood urea content and the amount of fat present.—B. OSWALD (KRIŽEVCI).

VARIČAK, T. D. (1938). Zur Kenntnis des Markes der Rumpfknochen Untersuchungen zwecks klinischer Auswertung an Pferd, Rind, Schwein, Hund und Katze. [The Marrow of the Bones of the Trunk in Horses, Cattle, Swine, Dogs and Cats].—*Arch. wiss. prakt. Tierheilk.* 73. 461-475. 4 figs. [Numerous refs.]

The vertebrae and sternum of 100 horses were examined for the distribution of red and yellow marrow. From the results, the impression was obtained that yellow marrow appears late in life but there was no definite age factor that could be connected with distribution. In horses under eight years old no yellow marrow was found, and in older horses there was great variation in the amounts of red and yellow marrow.

Three hundred cattle were examined in the same way. In calves no yellow marrow could be found; in animals 12-18 months old a great deal of yellow marrow was present, but its distribution was irregular.

Five hundred pigs were examined; about two thirds were under one year old and one third 1-2 years old. In all the animals a great deal of fat was present in the marrow, but histological examination revealed the existence of blood-forming tissues in the fatty areas. This was not the case with horses and cattle.—A. T. P.

ANDERSON, J., & DAUBNEY, R. (1938). Artificial Insemination of Cattle and Sheep in Kenya.—*Emp. J. exp. Agric.* 6. 193-205. 5 figs. on 1 plate, 2 tables. [Numerous refs.]

The work recorded here was undertaken in the first place largely because it was found that many bulls were sterile and that contagious granular vaginitis was of common occurrence in cows. Full details are given of the method employed, which consisted in (1) collection of the sperm from the male by means of an artificial vagina, (2) microscopic examination, and dilution of the sperm, and (3) injection of the sperm into the cervix of the female. Tables and results show that the procedure was successful in 299 out of 448 cows, and in 8,040 out of 5,742 ewes.

—W. J. IRONSIDE.

BØE, F. (1938). Studies on Prolonged Pregnancy in Rats.—*Acta path. microbiol. scand.* Suppl. No. 86. pp. 146. 26 figs., 27 tables. [Numerous refs.] [In English: French and German summaries].

This monograph gives the detailed results of experiments on prolongation of pregnancy in rats carried out during 1936 and 1937 at the University Pharmacological Institute, Oslo. It is known that administration of various hormones at suitable periods will retard pregnancy in rats, leading to expulsion of dead or macerated fetuses, or that parturition may not take place at all, and the animals may die undelivered. The following procedures were used by the author:—(a) administration of gonadotropic hormones from the serum of pregnant mares and from the urine of pregnant women, and also of pure oestrone benzoate and synthetic progesterone; (b) mechanical occlusion of the uterine horns, and (c) hypophysectomy. These were applied during the latter third of pregnancy and their effects noted in detail:—(1) in protracting the period of parturition; (2) on

the foetal weight and the fate of the foetuses *in utero*; (3) on the weight of the placentas; (4) on the gain in weight of the experimental animals, and (5) on the weights of the endocrine organs of dams and foetuses. Throughout the experiment adequate controls were used.

Whilst it is impossible to deal with the findings adequately in the short space of this review, it may be said that in general the effect of all these procedures was to prolong the period of pregnancy and occasionally to inhibit parturition completely. Foetal development was usually inhibited, though in the experiments with the gonatropic hormone from the urine of pregnant women and with progesterone there was an increase in foetal weight. The procedures used had no distinct effect on the weight of the placenta, whilst the gain in weight of the experimental animals was parallel to the foetal development. The effect on the endocrine organs was variable.

From his results the author concludes that the effect on the foetal development of the two types of gonadotropic hormone may be completely explained by the assumption of a secondary production of ovarian hormones. The intra-uterine death of the foetuses during prolonged pregnancy is thought to be due to the cessation of placental junction towards term. The changes in the endocrine organs seem to be caused by the slow death of the foetuses *in utero*.

A tremendous amount of interesting and detailed experimental work has been recorded, but the investigation appears to have thrown little light on the physiology of the initiation of parturition. The literature on the subject is well reviewed and an adequate bibliography is included, whilst the reproduction of both text and figures is all that could be desired.—A. ROBERTSON.

NEWTON, W. H. (1938). **Hormones and the Placenta.**—*Physiol. Rev.* 18. 419-446. [Numerous refs.]

It is now more or less taken for granted that the placenta is an endocrine organ, but its function, except in the most general terms, is not yet understood. N. reviews the relevant facts in the literature dealing with placental hormones and his conclusion are that:—(1) the evidence indicates that the placenta can produce oestrone, but that the possibility of its production from sources outside the genital tract, *e.g.* the hypertrophied foetal gonads in the pregnant mare, cannot be excluded; (2) the evidence in regard to the placenta as a source of progesterin is so scanty that no conclusions are possible, and (3) in regard to gonadotropic principles, it is widely accepted that those of the placenta, blood and urine in pregnancy are identical, and differ in their action from anterior pituitary extract in that they contain only the luteinizing and not both the follicle-stimulating and luteinizing principles. N., however, doubts whether the matter is as simple as this, since considerable confusion has arisen from the fact that the action of anterior pituitary extracts varies with the animals from which they were obtained and with the test animals employed. The article concludes with a general consideration of the hormonal function of the placenta during pregnancy.—N. J. SCORGIE.

## TECHNIQUE AND APPARATUS

SÖLDNER, I. (1937). Vergleichende Hämoglobinbestimmungen am Blut verschiedener Haustiere. [**Haemoglobin Content of the Blood of Domestic Animals**].—*Inaug. Diss., Munich*. pp. 32. 12 tables. [Numerous refs.]

S. compares various methods of estimating the haemoglobin content of the blood. The Autenrieth, the Hellige-ortho and the Hellige-normal haemoglobino-meters, and three sizes of the Burkner haemoglobinometer were used. The

Autenrieth and the Hellige-ortho proved to be the easiest instruments to read. The values given by the Burkner and the Autenrieth haemometers were higher than those of the others. The Burkner types have given very exact results with human blood, but S. considers that the Autenrieth is best for comparative work on the blood of animals.

The number of animals examined was too small for any conclusions to be drawn regarding the influence of breed, age, and state of nutrition on the erythrocyte count and haemoglobin content of the blood. The values found lay within the limits of those of other workers, with the exception of those for cattle, in which slightly higher values were obtained.—A. T. PHILLIPSON.

ROOS, J., & KOOPMANS, S. (1938). **Studies on the So-Called Electrical Stunning of Animals. Effect of the Intermittent Constant Current.**—*Vet. J.* 94. 376-388. 12 figs. on 4 plates, 4 tables. [18 refs.]

A review is given of experiments on the effect of electrical currents as anaesthetizing agents in man and animals. The view is expressed that the effect is one of motor inhibition rather than anaesthesia.

Details are given of the authors' experiments on cats, goats and pigs, using 70 volt currents of varying amperages (70-300 mA): the apparatus and methods employed are explained in detail and the effects produced are analysed and compared as they occur in the three species and in relation to the use of intermittent, direct and alternating currents respectively.

The significance of the eyelid reflex is discussed with special reference to the effect of the strength of the current and time of passage on the period of absence of this reflex.

It is concluded that the effect of electrical "stunning" is not to induce unconsciousness or to render the animal insensible to painful stimuli, but rather to render it incapable of exhibiting objective symptoms of pain.—H. BURROW.

HEINEMAN, P. G. (1938). **Critical Review of Methods for the Evaluation of Antiseptics.**—*Arch. Path.* 26. 320-326. [1 ref.]

Attention is called to potential sources of error in certain of the methods used for the evaluation of antiseptics. Various new methods which have been used by H. for some years are described and several of these are recommended for general use provisionally in the absence of official standard methods. The need for uniform methods of standardization is emphasized so that determinations carried out in different laboratories may yield comparable results.—ALFRED EDEN.

## MISCELLANEOUS

TURNER, Helen N. (1938). **Statistics for the Veterinarian. II.**—*Aust. vet. J.* 14. 2-11 and 60-67. 12 tables. [12 refs.] [See also *V. B.* 7. 306].

This is a continuation of a study dealing with the application of statistical methods to experiments likely to be carried out by veterinarians and others. It is unsatisfactory to attempt an abstract of this article; the numerous formulae and tables must be consulted in order to appreciate the study. It deals with qualitative data and includes detailed observations on definitions and first principles of probability, criteria to be satisfied, proportions, and the  $\chi^2$  test. These aspects are illustrated by data from typical experiments. The series is to be concluded.

—H. McL. GORDON.

FELDMAN, W. H. (1938). **The Role of Pathologist in Diseases of Poultry.**—*J. Amer. vet. med. Ass.* **93**. 15-18.

A general article, with no new information.—J. E. WILSON.

- I. VON OSTERTAG, R. (1938). Ueber unsere Kolonien und den kolonialen Veterinärdienst, insbesondere in den zur Zeit unter Mandat stehenden Kolonien Deutsch-Südwestafrika und Deutsch-Ostafrika. [**The Former German Colonies and Veterinary Services Therein**].—*Dtsch. tierärztl. Wschr.* **46**. 65-71.
- II. KNUTH, P. (1938). Ueber meine Studienreise nach Afrika in den Jahren 1906 und 1907. [**My Study Tour in Africa in 1906 and 1907**].—*Berl. tierärztl. Wschr.* Jan. 7th. 14-16, Jan. 14th. 30-32, and Jan. 21st. 43-44.
- III. LICHTENHELD. (1938). Erinnerungen an meine Tätigkeit in Deutsch-Ostafrika. [**Veterinary Reminiscences from Former German East Africa**].—*Ibid.* Feb. 18th. 106-107, and Feb. 25th. 118-119. 12 figs.
- IV. KNUTH, P. (1938). Ueber die heutige Organisation des Veterinärwesens und den Stand der Tierseuchen im Tanganyika Territory (ehemaliges Deutsch-Ostafrika). [**Veterinary Organization and Animal Diseases in Tanganyika**].—*Ibid.* April 15th. 223-226. 8 tables, 1 map. [4 refs.]

I. The veterinary history of German South-West Africa began in 1894 when Dr RICKMANN was in charge of veterinary work there. He eradicated contagious bovine pleuro-pneumonia before 1900.

In 1910, the author was sent out to cope with a serious sheep disease, which he identified as sheep pox. The infection had been brought in on Karakul sheep from Persia and it was controlled by vaccination and segregation. Other diseases present at the time included glanders, African horse-sickness, sheep scab, mange in horses and goats, and bluetongue of sheep, besides the other well known enzootic infections. The first veterinary laboratory was set up on Dr RICKMANN's recommendation at Gammams, near Windhoek.

In 1913, the author was sent to German East Africa to lead rinderpest control. His travels are described, and notes are given on other diseases.

II. This is an interesting account of K's travels to England, France, Egypt and to the British and German colonial territories of east, south and west Africa. He had been appointed as the first Director of the new Tropical Department of the Hygiene Institute of Berlin veterinary school in 1906, and this study tour was his first duty. He relates many points of historical scientific interest in connexion with veterinary research, and refers to people he met, so that the report is of much biographical interest.

III. An interesting personal account of veterinary affairs in German East Africa between 1905 and 1914, during which period the veterinary service grew from two to 28 persons.

A veterinary institute for rinderpest control was founded at Mpwapwa about the year 1913, being in charge of Dr WOELFEL, while L. was head of the veterinary service.

IV. This is a rather detailed abstract of the veterinary report of Tanganyika for 1935, with footnotes on certain matters on which Germans also have worked.  
—J. E.

MANUSARDI, L. (1938). Appunti di patologia veterinaria in A.O. [**Veterinary Pathological Notes from East Africa**].—*Azione vet.* **7**. 627-629. [12 refs.]

M. gives a series of discursive notes on points of veterinary interest observed by himself in connexion with the horses and camels employed in the Abyssinian

campaign. He discusses the type of horse required for the work and says that all requisites were found in the Berber Arab. These horses were all entires, whereas the Abyssinian horses employed were usually geldings. He hazards the opinion that, apart from all other considerations, the gelding of horses weakens their powers of resistance to disease. The greatest nuisance was the common tick [genus not given]. He gives a few scattered notes on forms of mange and dermoid cysts in camels, and the methods of treatment employed by native camel men.—S. F. J. H.

GIRARDON, C. A. (1938). Per il potenziamento dell'Impero Guardie veterinaire indigne dell'Eritrea. [*The Eritrean Native Veterinary Guards*].—*Azione vet.* 7. 543-545. 1 fig.

The enlistment of a body of native Abyssinians in veterinary patrols was started in 1935. The sanctioned numbers are 100 men, including 72 privates, 20 under-officers and eight superior officers in two grades. Enrolment was apparently not complete at the time of publication of this article. The enrolment was placed in the hands of the Divisional Commissioners, the idea being to employ men drawn from the regions in which they would have to work. Details are given as to uniform and equipment. The men employed in the lowlands are mounted on camels; those on the higher plateau may be on foot or mounted on mules.

All the men attend a course of instruction at the Serum-Vaccine Institute, Asmara. Their duties are to inspect flocks and herds, report breaches of regulations and outbreaks of contagious diseases, arrange for the isolation of centres of infection, and generally to enforce orders issued by the Veterinary Corps.—S. F. J. H.

BRILA, J., & CERNAIANU, C. (1938). L'organisation des laboratoires régionaux de bactériologie vétérinaire. [*Organisation of Regional Veterinary Bacteriological Laboratories*].—*Bull. Off. internat. Epiz.* 16. 195-204. Discussion pp. 370-376.

As a result of experience gained in Rumania, the authors are convinced that an efficient State Veterinary service must have regional laboratories in direct touch with a central laboratory. Apart from the need for reliable and rapid diagnosis in the control of contagious disease, such regional laboratories would serve as depots where vaccines, sera and diagnostic agents can be stored under suitable conditions and distributed to practitioners without delay. The personnel of such laboratories would be conversant with local conditions and would serve as advisers to practitioners and breeders in their areas regarding not only disease, but also breeding and the maintenance of health. These laboratories could also devote their attention to local problems, and should have facilities for P.M., histological, bacteriological and parasitological examinations. Detailed and specialized investigations would be referred by them to the central laboratory. Regional laboratories should also furnish library facilities and have a conference room where local associations could meet for papers and discussions.—GWILYM O. DAVIES.

#### OFFICIAL AND OTHER REPORTS

AUSTRALIA, NEW SOUTH WALES. (1938). *Live Stock Diseases Report (No. 13). Recording Control Work during the Year ended 30th June, 1937.* [HENRY, M.] pp. 24. 5 tables. Sydney: David Harold Paisley, Govt. Printer. [8vo].

The outstanding feature of the year was the invasion of N.S.W. by the cattle

disease known as ephemeral fever, or "three-day sickness". The history of the spread of this disease is traced in some detail.

**ANIMAL DISEASES.**—Two cases of **JOHNE'S DISEASE** are recorded. Outbreaks of **ANTHRAX**, **BLACKLEG**, **PIROPLASMOSIS** and **CONTAGIOUS PLEURO-PNEUMONIA** are described.

On several occasions heavy coccidiosis infections in lambs were diagnosed; it is necessary to differentiate this condition from parasitic gastro-enteritis. Losses from pregnancy toxæmia in sheep were severe owing to adverse seasonal conditions in certain parts of the State. Poor nutritional conditions were evident in all cases.

A table shows the relative incidence of sheep lice and sheep keds in N.S.W. and at the same time indicates the number of holdings quarantined and the number of sheep involved. Eradication of the cattle tick (*Boophilus microplus*) has been further advanced, the year under review showing probably the most important step forward ever recorded in Australia in the campaign against this parasite. It involved repeated dipping, at 14-day intervals, of 65,500 cattle, 550 sheep and many horses. Chorioptic mange of horses has become of considerable importance in certain areas, and a number of community dips have been established.

The year was unfavourable for the development of helminth infestation, so there was little loss from this cause. The wide-spread use of carbon tetrachloride has made chronic fluke disease (**FASCIOLIASIS**) a rarity, but on the other hand losses from acute fluke infestation and "black disease" (**INFECTIOUS NECROTIC HEPATITIS**) have been of increasing importance.

**POULTRY DISEASES.**—The following are briefly mentioned:—pullorum disease, fowl cholera, coccidiosis, fowl pox, laryngo-tracheitis, entero-hepatitis, neuro-lymphomatosis gallinarum, enteritis, leucoses, erythromyelosis, sinusitis in turkeys and necrosis of digits.

**GLENFIELD VETERINARY RESEARCH STATION.**—A great deal of routine diagnostic work was carried out, particularly in relation to **CONTAGIOUS BOVINE ABORTION** and **CONTAGIOUS BOVINE PLEURO-PNEUMONIA** (complement-fixation test). Research was carried out on the following problems:—**CONTAGIOUS BOVINE MASTITIS**, **SALMONELLOSIS** of stock, **CONTAGIOUS BOVINE ABORTION**, **EPHEMERAL FEVER** of cattle, **NUTRITIONAL ANAEMIA** of sheep, sheep **BLOWFLY**, rugging of sheep, **TOXAEMIC JAUNDICE** of sheep, **ICTEROHAEMOGLOBINURIA** of calves, certain poultry diseases, and poisonous plants.

Other sections of the report contain a brief discussion on animal husbandry, particularly in relation to feeding, overseas quarantine, border control, export of stock, treatment of stock on Government farms, inspection of dairy herds, Swine Compensation Act, livestock statistics, etc.—H. McL. GORDON.

**COLONY AND PROTECTORATE OF KENYA. (1938). Annual Report of the Veterinary Department, 1937.** [MULLIGAN, E. J.] pp. 121. Numerous tables, 1 chart, 1 map. Nairobi: Govt. Printer. [8vo] [Shs. 2/50].

#### GENERAL.

In June, 1937, the former "Animal Industry Division" of the Department of Agriculture became an autonomous "Veterinary Department". The staff was reorganized, and now consists of the Director (Mr R. DAUBNEY), two Deputy-Directors (Mr E. J. MULLIGAN, field services, and Mr J. R. HUDSON, laboratory services), eight veterinary field officers, two veterinary research officers and one entomologist (apart from sundry other non-veterinary posts). The research section of the report is not separate as in previous years, and it is therefore dealt with in the text below. Climatic conditions were favourable, and grazing was the best for many

years. Important conclusions in a report of the Meat and Livestock Inquiry Committee included energetic measures to deal with overstocking in native areas: establishment of a meat-export trade appeared essential to the survival and development of agriculture, and a trade in cold-stored meat was envisaged. RINDERPEST is the chief problem, but new immunization methods render it less formidable. The development of a cheap but effective method of immunization for use in native areas (in the form of goat-passaged virus) is viewed with optimism, though difficulties of preservation and transport must be overcome. Game are not considered a danger in absence of active disease in cattle.

#### ANIMAL DISEASES.

**SETTLED AREAS.**—There were 29 outbreaks of ANTHRAX, three cases of ULCERATIVE LYMPHANGITIS and 160 outbreaks of BLACKLEG. Forty-one outbreaks of EAST COAST FEVER occurred in "clean" areas and 105 in enzootic areas. There were four outbreaks of RIFT VALLEY FEVER, over 1,000 lambs having died in one outbreak. Thirty-eight outbreaks of RINDERPEST occurred, 18,301 serum-virus, 215 serum, 2,556 vaccine, and 8,958 vaccine-virus inoculations were carried out. There were ten outbreaks of FOOT AND MOUTH DISEASE. Forty-nine cases of HORSE-SICKNESS were noted, and precautionary vaccinations accounted for a low death rate. Three cases of RABIES in jackal were confirmed. Other diseases reported are summarized.

**NATIVE RESERVES.**—Sporadic cases of ANTHRAX occurred. There were many outbreaks of BLACKLEG and there was a much increased demand for vaccination. CONTAGIOUS BOVINE PLEURO-PNEUMONIA was still prevalent in several reserves and 228,625 vaccinations were effected. TRYPANOSOMIASIS was prevalent in many areas. The incidence of EAST COAST FEVER in some areas was not so great as in previous years. 79,518 serum-virus and 50,752 vaccine inoculations were carried out in controlling numerous outbreaks of RINDERPEST. One serious outbreak of FOOT AND MOUTH DISEASE and several minor ones are recorded.

#### ANIMAL HUSBANDRY.

Shade-drying of hides was more widely practised and hide and skin exports were valued at £300,352 as compared with £191,421 in 1936.

#### RESEARCH.

Despite shortage of staff the Department carried out much important research in addition to the work of routine diagnosis and preparation of a large variety of vaccines, drugs, etc.

**DISEASE CONTROL.**—In work on RINDERPEST, Muktesar goat-passaged virus produced a mortality of 16-25% in local cattle, but 80 c.c. doses of serum gave protection to animals inoculated with this virus. When preceded by tissue vaccine that virus gave good results. Methods of ensuring a reasonably constant virus content of goat-virus products are being investigated, since variations in virus content probably account for many failures to immunize in field inoculations. Passage of Kabete virus through goats was continued and reached its 160th transfer. Other strains were also set up. The virus is becoming adapted to goats and definitely attenuated for cattle. Inoculation with either Muktesar or Kabete goat-passaged virus seems to cause a tendency for breakdown to coccidiosis. Preliminary experiments on cultivation of the virus in tissue-culture were made.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA was set up in experimental animals by intravenous injection of thoracic lymph in agar. Experiments on a fatty-base vaccine gave promising results.

In work on CONTAGIOUS ABORTION, inoculation of a fatty-base vaccine did not lead to abortion, but produced an infection comparable with the natural one.

Experiments were made on survival of *Brucella abortus* and *Br. melitensis* organisms frozen, dried, and stored *in vacuo*.

Details are given of experimental vaccine for RIFT VALLEY FEVER. A hyper-immune bovine serum appeared to give good results in lambs.

The virus disease of fowls occurring in Kenya and thought to be NEWCASTLE DISEASE was proved, by cross-immunity tests carried out at Weybridge, to be identical with this disease.

A "rickettsia infection" of the dog is described. Work on "specific transmissible petechial fever of cattle" was continued and it was shown to be in no way related to THREE-DAY-SICKNESS or to HEARTWATER.

NAIVASHA EXPERIMENTAL STATION.—Numerous experiments and surveys in connexion with the oestrous cycles of cattle and sheep, artificial insemination, fertility in bulls, etc., are described. An enlargement and fibrosis of the epididymis in bulls was suspected to be caused by an infection obtained from the cow and was a common cause of sterility. Zebu bulls showed a high fertility. Pregnancy diagnosis tests on 89 mares gave 98.1% correct results.

TICKS AND EAST COAST FEVER.—Exposure to a low temperature for three days did not prevent development of theileria in the tick *Rhipicephalus appendiculatus*. Under experimental conditions *Hyalomma dromedarii* and *H. anatolicum* were shown capable of transmitting *Th. parva*.

TSETSE FLY.—Surveys were made and reclamation initiated or continued in several areas. New information on habits of *Glossina fuscipleuris* was gained. Breeding places were described and pupae collected for the first time.—H. E. H.

CYPRUS. (1938). **Annual Report of the Veterinary Service for the Year 1937.** [ROE, R. J.] pp. 9. 2 tables. Nicosia: Cyprus Govt. Printing Office. [fcp].

ANIMAL DISEASES.—No serious outbreaks occurred in cattle or equines. Routine vaccination of livestock against ANTHRAX was again markedly successful, losses from this disease being estimated at £300 as compared with an estimated loss of £20,000 p.a. before vaccination was practised. 532,493 animals were vaccinated. Vaccination was completely effective for sheep, but occasional breakdowns occurred in goats. Vaccine was still effective after storage at 30°-35°F. for eleven months.

TUBERCULOSIS and CONTAGIOUS ABORTION appear to have been eradicated.

Overstocking and severe HELMINTHIASIS of sheep and goats were aggravated in the winter of 1936-1937 by exceptionally cold and wet weather, and heavy mortality resulted. A number of outbreaks of CONTAGIOUS PUSTULAR DERMATITIS in sheep and goats also occurred at this time. At the close of the year climatic conditions were more favourable.

Preliminary work on the incidence of CATTLE WARBLER and experimental treatment in one area indicated that heavy loss is caused by the pest and that extensive measures for its control would be practicable. Arrangements were made to carry out more extensive tests in 1938.

RESEARCH.—The work of the laboratory section was curtailed owing to leave arrangements; this work included preparation of anthrax vaccine, fowl pox and fowl typhoid vaccines, and examinations of 580 specimens submitted to the laboratory. Progress in a parasite survey and formation of a museum collection of parasites is recorded.

GENERAL.—Licensing of stallions in Cyprus has resulted in steady improvement in horses used for mule-breeding. Meat inspection records indicate that ECHINOCOCCOSIS is the chief cause of condemnation.—H. E. HARBOUR.

MALAYA. (1938). **Report on the Veterinary Departments for the Year 1937.** [WHITWORTH, S. H.] pp. 104. 8 plates, 16 tables, 1 map. Kuala Lumpur : Govt. Printer [8vo] [\$1] [2s. 4d.]

Organization and staff, finance, traffic in animals, animal slaughter and meat inspection, and survey of livestock are dealt with in considerable detail in the opening sections of the report [pp. 1-20]. The European staff numbered 11 and the native staff 116. Numerous statistics are provided. Observations by the Veterinary Officer, Perak (ORR, W.) on certain pathological conditions commonly seen in swine in local abattoirs (focal cirrhosis of liver, "glandular abscesses", inflammatory changes of the kidney) led to the suggestion that migratory helminth larvae might play a major part in establishing foci of infection. Damage to tissues is probably caused both by progress of larvae and by introduction of pathogenic bacteria.

**ANIMAL HUSBANDRY.**—Progress is recorded in the various States in improvements of local methods of animal husbandry and of local breeds of stock by establishment of livestock shows, propaganda, importation of bulls, improvements in dairy hygiene, establishment of grazing reserves, etc. The section also includes interesting and detailed observations on the origin, economics, and general management of local breeds of cattle, buffaloes, sheep, goats, and swine.

**ANIMAL DISEASES.**—**ANTHRAX** occurred in buffaloes and oxen imported from Siam. **STRANGLES** occurred in newly arrived young racehorses from Australia. The incidence of **TUBERCULOSIS** was low; precautions against its introduction in breeding stock are taken. Sporadic cases of **TRYPANOSOMIASIS** were diagnosed in buffaloes and dogs. **PIROPLASMOSIS** and **ANAPLASMOSIS** affect imported cattle, local [Zebu] cattle being premune. Two fatal cases occurred in imported Friesian cows. **Acaprin** is used in treatment (1 c.c. of a 5% solution per 100 lb. body weight), generally with success.

Numerous outbreaks of **FOOT AND MOUTH DISEASE** occurred and are described in detail. The disease was usually mild, and infectivity high. Mortality was mainly confined to young calves. The virus appeared to be of the same strain as in 1936 outbreaks, since cattle infected then withstood the later infection. Goats were suggested as active agents in spreading the disease, and the importance of very thorough examination of imported goats is stressed. The disease was controlled by quarantine and regulation of movements, but control was often made difficult because of the insanitary surroundings of cattle sheds, inadequate accommodation for sick and contacts, and lack of co-operation of owners. Generally the duration of the disease was about a month in each centre.

Three fatal cases of **HAEMORRHAGIC SEPTICAEMIA** occurred in buffaloes affected with **FOOT AND MOUTH DISEASE**. It is suggested that lesions of this disease provided entry for the *Pasteurella*. Numerous outbreaks of **SWINE FEVER** occurred.

Twenty-five deaths occurred out of 28 detected cases in outbreaks of **INFECTIOUS CAPRINE PLEURO-PNEUMONIA** in Perak. Detailed observations on symptoms and P.M. lesions are recorded.

**RABIES** was prevalent in Northern Kedah and Perlis, and two cases occurred in Kelantan. Muzzling orders were maintained and stray dogs were destroyed. The Settlement of Singapore was declared a rabies-infected area in August 1937, for the first time since 1907. The infection originated in a dog introduced from the Philippine Islands; this was a case of furious rabies. Succeeding cases were of the dumb type. Sixteen pages of the report are devoted to a detailed description of the outbreak and its control. 12,000 dogs in the settlement were vaccinated, only four of which subsequently developed the disease. 15,802 uncontrolled dogs were shot. Incubation periods ranged from 24 to 75 days. No human cases occurred.

CANINE and FELINE DISTEMPER of a virulent type occurred in many parts of Malaya during the year.

Several cases of ARSENICAL POISONING were confirmed.

Among poultry, a number of outbreaks of DIPHTHERITIC STOMATO-PHARYNGITIS occurred, mortality often approaching 100%. Transmission experiments suggested that the disease can develop and terminate fatally without development of the typical mouth and bowel lesions by which it is usually diagnosed.

RESEARCH.—An experiment on 109 buffaloes gave no confirmation of the suggestion that anthrax bacilli can occur in the blood of normal healthy cattle. Acid-alcohol-fast bacteria resembling *Mycobacterium tuberculosis* were recovered from the lung and bronchial glands of a pig and were cultured. Inoculation experiments were inconclusive as to pathogenicity. Lesions in the form of indolent, ulcerating sores, known as KRIAN SORE, occurred in cattle, usually on the limbs. A detailed account is given. Marked infiltration with eosinophiles suggested a parasitic infection and it was thought that this might be associated with FILARIASIS. Detailed observations on CONTAGIOUS ECTHYMA of GOATS are given. An experiment on the efficacy of Behring Swine Fever serum against the local strain of virus was inconclusive. A list of helminth parasites of livestock occurring in Malaya is given, together with comments on associated pathogenesis and symptoms.

—H. E. HARBOUR.

JAMAICA. (1938). **Report of the Senior Veterinary Officer for Year 1937.** [LOCKETT, S.]—*Rep. Dep. Agric. Jamaica 1937.* pp. 81-41.

General weather conditions were favourable to livestock.

ANIMAL DISEASES.—Outbreaks of equine strangles, anthrax, ulcerative lymphangitis of mules, blackleg, texas fever, gall-sickness, swine fever and dog distemper are recorded, and the methods of dealing with them are noted. Treatment of ULCERATIVE LYMPHANGITIS of mules by intravenous injection of neosphenamine gave favourable results. Acaprin is being tested as a curative agent in PIROPLASMOSIS, but no results are recorded. The island has been free from FOOT AND MOUTH DISEASE since 1926. In outbreaks of SWINE FEVER the serum-virus method of immunization is being instituted, legal quarantine measures for suppression by isolation having failed.

STOCK FARM, HOPE.—Tuberculin tests of farm cattle over the period 1927-37 are recorded. Abortion and associated troubles were a serious problem. Eleven non-breeding cows were treated by ovarian manipulation *per rectum* accompanied by intramuscular injections of wheat germ oil, but without success. FOWL POX and a subacute type of FOWL CHOLERA are recorded.

STUD FARM, GROVE PLACE.—PSOROPTIC MANGE of equines was controlled by treatment with lime-sulphur wash. The disease is wide-spread in the island.

—H. E. HARBOUR.

UNITED STATES OF AMERICA, MICHIGAN. (1937). **Report of the Division of Veterinary Science, Michigan State College of Agriculture and Applied Science, East Lansing, 1937.** [GILTNER, W.] pp. 86. 14 tables. [8vo].

A brief general report is given of the activities of the Veterinary College, and is followed by the reports of the various departments.

ANIMAL PATHOLOGY. [KILLHAM, B. J.]—The scope of the Federal project for BRUCELLA INFECTION CONTROL increased and continued to supersede the State scheme. The incidence of infection in untested herds was thought to be about 12%. For the year ended October 31st, 1936, a total of 217,162 cattle were tested

and 7,927 reactors were found. On November 1st, 1936, 16.6 % of the breeding cattle in the State were reported to be under supervision.

The number of horses treated during the year for ecto- and endoparasites was 49,049.

EXPERIMENTAL WORK. [MALLMANN, W. L.] The amount of service work in connexion with MASTITIS decreased as routine tests were taken over by the Animal Pathology Laboratory, and only tests whose results were of value in research were done in this section. 5,000 milk samples were tested, and many cultures were made and the organisms identified. Work on the control of moulds on eggs in cold storage, and on the bacteriological value of ultra-violet rays was continued.

H. J. STAFSETH published a report on streptococcal infections in dogs. Work on the chemical composition of *Salmonella pullorum* with a view to improving the antigen used in the rapid whole blood test was published by W. J. STAHL. The work on COCCIDIOSIS was suspended. 3,678 poultry specimens were submitted for examination, a decrease of 90 on the previous year.

## BOOK REVIEWS

HOPFENGÄRTNER, M. [Veterinärmedizinalrat an der Bayer. Veterinärpolizeilichen Anstalt Schliessheim]. (1939). Leitfaden der tierärztlichen Lebensmittelüberwachung. [Introduction to Veterinary Food Supervision]. pp. xv + 240. 5 figs., 5 tables. [Numerous refs.] Stuttgart: Ferdinand Enke. [8vo] [RM. 12].

The *raison d'être* of this book was the Reichstierärzteordnung of 1936, by which it was ordained that the health of the German people, as regards the supply of food of animal origin was concerned, should be entrusted to the veterinary profession. The author has been engaged in giving special courses of instruction to the veterinary food inspectors of Bavaria, and this book is the outcome.

The contents are as follows:—(A) laws concerning food of animal origin, (B) veterinary instruction on the inspection of such food (general information on carcasses of mammals; poultry, game and wildfowl; fish, molluscs, crabs, frogs, etc., and eggs and milk); (C) practical technique for food inspection; (D) age estimation of the animals named above, and finally a select bibliography.

The book is excellent as a reference work on scientific and technical food inspection, particularly as regards the identification of tissues and organs of the numerous animals dealt with; its value therefore extends beyond Germany. There is a good index, and the printing is quite satisfactory.—J. E.

FRANCKE, G. [Oberregierungs- und Veterinärarzt a.D.]. (1937). Das Fleischbeschaugesetz. [The German Meat Inspection Law]. pp. 551. Wittenberge: Gebr. Bischoff. [8vo] [RM. 5.50].

This is a revised edition of the book which first appeared in 1929. Since then the law has been changed, by the 1937 "Law for the Alteration of the Meat Inspection Law". The book includes the new text, and also sections of other laws which regulate the work and certain social conditions of all who are engaged in meat inspection and abattoir work, e.g. trichina inspection, animal protection, and also the taxes and insurance, etc. to which those employed in these services are liable.

It is of a handy size and has a good index, and is a useful reference book.—J. E.

PLIMMER, R. H. A. [D.Sc., Professor of Chemistry in the University of London, at St. Thomas's Hospital Medical School]. (1938). **Organic and Bio-Chemistry**. pp. x+623. 69 figs., 1 plate, numerous tables. [Numerous refs.] London, New York, Toronto: Longmans, Green and Co. [6th Edit.] [8vo] [21s.]

The appearance of the sixth edition of this excellent book by Dr Plimmer affords further evidence of its wide popularity and usefulness. Originally written in 1910 as a book on practical physiological chemistry, in 1915 it was enlarged so as to include practical organic chemistry also. In 1926 it was again enlarged to include a more extensive treatment of theoretical organic chemistry, and this met with such general approval by readers that the author amplified still further the theoretical aspects of both the organic and the physiological chemistry sections, and changed the title to its present form, although the book still retains its practical character. The latest edition is substantially the same as its predecessor, with the inclusion of some new material and a revision of some of the older parts to bring them into line with modern knowledge.

The object of the author to "consider organic chemistry as the basis of physiological chemistry, or rather, the two as one subject—biochemistry" and its realization in the present form has been amply justified in the response that the book has already received, and with the incorporation of the same material revised in the light of modern knowledge there is every good reason why the book should still maintain its high popularity with both teachers and students, in the widest sense.

The fundamentals of both organic and physiological chemistry are adequately covered, and although, naturally, the more advanced knowledge of each subject could not possibly be included in a book of such modest size, the material contained in its 600 pages provides a very thorough treatment of both subjects, including full details of practical methods that have stood the test of time and experience. The book can be warmly recommended by one who derived much knowledge and help from one of its earlier editions.—ALFRED EDEN.

VORONOFF, S. (1939). *Grefte des glandes endocrines*. [**Endocrine Gland Grafting**]. pp. xii + 286. 96 figs. Paris: G. Doin & Co. [8vo] [Fr. 120].

There is no doubt that the secretory activity of the glands of internal secretion varies in different individuals, and that certain symptoms or syndromes may follow when the rate of secretion is decreased.

The author has attempted to replace the secretory activity of deficient glands (thyroid, parathyroid, testis, or ovary) by grafting the glands from monkeys into human beings. He describes in detail the precautions to be taken in the technique of grafting, and rightly stresses the importance of grafting small pieces and of insuring vascularization. The operative techniques are profusely illustrated.

The first question arising is whether glands grafted from the monkey into the human being will take, and be functional. In view of the importance of this question one would expect it to be treated fully, and with detailed evidence. Unfortunately, the data presented are few and, on the whole, unconvincing.

The aspect of the author's work which has excited most interest has been his attempt to produce rejuvenation by gland grafting. There exist, however, no reliable objective criteria for measuring the age of an individual, and the absence of any attempt to control the results (which are strikingly illustrated) tends to induce scepticism.

The recent development in the work on sex hormones has put at our disposal other methods with which more exact and reliable replacement of the endocrine activity may be obtained.—J. M. ROBSON.

KLETT, R. [Prof. Dr. med. vet. Tuttlingen (Württemberg)], & METZGER, R. [Veterinär-rat Dr. med. vet. Säckingen (Baden)]. (1988). *Uebele-Handlexikon der tierärztlichen Praxis*. 1. Band. [*Uebele's Handbook of Veterinary Practice*. Vol. 1]. pp. viii + 859. Ulm, Donau : J. Ebner'sche Verlagsbuchhandlung. [5th Edit.] [8vo] [RM. 52].

This book occupies the same position in Germany as does BANHAM and YOUNG's "Posology" in Great Britain. It first appeared in 1909, and the succeeding four editions were prepared by Professor KLETT and Dr METZGER.

The book is divided into :- sections on drugs arranged according to use under some 80 headings ; lists of drugs in alphabetical order with brief details concerning their composition, usage, dosage, and indications ; tables, and chapters of general information of value in pharmacy ; prescriptions, and addresses of drug manufacturers and similar information. Drugs included are those listed in the Deutsche Arzneibuch : among them are numerous proprietary preparations of which the composition has been divulged.

The book is doubtless considered indispensable in Germany. It is also of great value to readers of German veterinary literature who are often puzzled over the nature of the proprietary remedies therein mentioned.—J. E.

LÄGEL, R., Jr. [Dr., Rechtsanwalt], DOENECKE, H. [Prof. Dr., Direktor des Veterinär-Instituts und der Tierklinik der Universität Breslau], JAKOB, H. [Prof. Dr., Direktor der medizinischen und forensischen Veterinärklinik der Universität Giessen], OPPERMAN, T. [Prof. Dr., Direktor der medizinischen und forensischen Klinik der Tierärztlichen Hochschule Hannover], & SCHÖNBERG, F. [Prof. Dr., Direktor des Instituts für tierärztliche Lebensmittelkunde der Tierärztlichen Hochschule Hannover]. (1988). *Der Tierarzt im Recht. Tierärztliche Rechts- und Gesetzeskunde zum praktischen Gebrauch und zum Studium für Tierärzte und Rechtswahrer. [Law in Relation to the Veterinary Surgeon]*. pp. vii + 147. [Numerous refs.] Stuttgart : Ferdinand Enke. [8vo] [RM. 6.80].

Heretofore German veterinarians have had no single source of reference or information on all aspects of the law concerning the various aspects of their work. LÄGEL has now provided such a book, which he wrote in collaboration with the four well known veterinary authorities.

There are three parts, dealing with :- (1) professional veterinary jurisprudence ; (2) private veterinary jurisprudence, and (8) the veterinarian in common law. The first part is concerned with the veterinary profession as a whole, as laid down in the Reichstierärzteordnung of 1986, the second deals with the veterinarian's private covenant with his client and the question of his liability for accidents to animals in his care, and also with the ethics of conduct within the profession ; the third covers the veterinarian's public health duties, his part in the sale of drugs, his concern with cruelty to animals, his standing as an expert witness, and his taxes.

Whilst not applying to any country except Germany, the book should appeal to all interested in the law and the veterinary profession.—J. E.

# IMPERIAL BUREAU OF ANIMAL HEALTH

## THE VETERINARY BULLETIN

---

Vol. 9.]

July, 1939.

[No. 7.]

---

### DISEASES CAUSED BY BACTERIA AND FUNGI

STABLEFORTH, A. W. (1938). *Streptococcus Infections of Animals and their Treatment.*—*Vet. Rec.* 50. 1203-1214. 1 table.

Streptococci can be differentiated by morphology, by fermentative or enzymic properties, by lysis of erythrocytes, and by serological or antigenic characters. On a serological basis it has been shown that streptococci fall into broad groups related to their habitat. Thus nearly all the pathogenic streptococci of man belong to Group A, those from chronic bovine mastitis to Group B, those from horses to Group C, and those from dogs to Group G. Streptococci of Groups E to K are usually non-pathogenic. Several of these groups contain a number of serological types, and some overlapping may occur.

The only important streptococcal disease of bovines is mastitis. This may be caused by several groups of streptococci. The common chronic type is due to *Str. agalactiae* of Group B, more acute streptococcal types being caused by *Str. dysgalactiae* and *Str. uberis* (Diernhofer) and the haemolytic streptococci of Groups A and C.

In equines, streptococci have been incriminated in pneumonia, abortion, joint-ill, and chronic metritis. So far, all streptococci from horses have fallen into Group C without overlapping.

In dogs, haemolytic streptococci are associated with tonsillitis, otitis media, sterility, puerperal fever, acute adenitis, septicaemia and cellulitis. The majority of strains belong to Group G, but a few fall into other groupings.

Apart from symptomatic and palliative measures, the control and treatment of streptococcal diseases lies in segregation of the infected animals, vaccination, and chemotherapy. Much information is required before control by segregation can be regarded as sound. Vaccines in general have proved disappointing. For local chemotherapeutic treatment, the acridine dyes and flavines have proved very successful. Internally, sulphanilamide has given protection against Group C streptococci, and clinical reports suggest that it is effective also against Group G. The drug is well tolerated by domestic animals.—D. D. OGILVIE.

MÉSZÁROS, I. (1936). Adatok a *Streptococcus mastitidis* differential-diagnostikai tenyésztéséhez. [Selective Cultivation of *Str. mastitidis*].—*Közl. Öesszeas. élet- és kortan Köréből.* 26. 536-542.

In experiments on 900 milk samples M. found that cultivation on agar plates containing bromcresol purple, saccharose, and "serum-alkali-albumin" was a very reliable method for the demonstration of mastitis streptococci. The medium

can be stored in closed bottles for a considerable period (four months in the case of M's experiments) without any change in quality. The organisms will grow on the medium at room temperature; in this case, however, the characteristic yellow area surrounding the streptococci is produced somewhat later than in incubated cultures, and does not appear for 22-25 hours.—G. SÁLYI (BUDAPEST).

SPANEDDA, A., & ONANO, F. (1937). Sull'organotropismo degli streptococchi. [**Organotropism of Streptococci**].—*G. Batt. Immun.* 18. 329-352. 1 fig. [English, French, and German summaries].

The authors attempted to induce tropism for a given organ in streptococcus strains isolated from patients free from complications or secondary localizations of infection, by repeated passage *in vitro* in media prepared from the organ concerned. They further attempted to re-establish by the same means tropism considered to be latent in strains isolated from certain organ lesions. The results were positive in 25% of all cases in both series of experiments.

DE BENEDETTI, M. (1937). Ricerche sul potere fibrinolitico di streptococchi isolati da focolai morbosì di uomo e di animali domestici. [**Fibrinolytic Power of Streptococci of Human and Animal Origin**].—*G. Batt. Immun.* 18. 56-60. [English, French and German summaries].

On the grounds of their fibrinolytic power, their capacity to hydrolyse saccharose, maltose, glucose, lactose, levulose, and mannite, and their resistance to bile, the author divides seven tested strains of *Streptococcus scarlatinae* isolated from scarlet fever patients into three distinct groups. Since, however, this grouping did not coincide with that based on the serological tests of the strains, he does not consider it of diagnostic value [see also *V. B.* 7. 312].

LEMAR, J. D., & GUNDERSON, M. F. (1938). **Fibrinolytic Activity of Streptococci of Human and Animal Origin**.—*J. Bact.* 36. 569-570.

The fibrinolytic activity of 70 strains of streptococci from superficial infections in animals, including the horse, cow, sheep, pig, g. pig, rabbit, fox and chicken, was compared with that of 40 strains of human streptococci. Fibrin from various sources was employed from man, the horse, ox, pig, sheep, dog, g. pig, rabbit, pigeon and duck. The animal streptococci were active against all fibrins, most markedly against human, and least against horse and pigeon fibrin. Fibrinolysis occurred progressively up to 96 hours with most strains. Species pathogenicity could not be correlated with specific fibrinolytic power.—R. O. MUIR.

PENSO, G. (1936). Panoftalmite epizootica del coniglio a etiologia streptococcica. [**Epizootic Panophthalmia of Rabbits**].—*Azione vet.* 5. 439-442. 2 figs.

Ophthalmia developed in two batches of rabbits, both of the same origin; they had been received for experimental purposes at P's laboratory. Some died, while others recovered but became blind.

P.M. there was peritonitis with a sero-haemorrhagic peritoneal exudate, and there were similar changes in the pleura and pericardium. Gram-positive haemolytic streptococci were found in purulent exudate from the eye. The cultural characters in liquid and solid culture media are described; there was no liquefaction of gelatin, milk was coagulated in 3-4 days, and there was no growth on potato.

Serum from the surviving animals agglutinated the streptococcus. Subcutaneous injection of 0.1 c.c. of broth culture given subcutaneously killed rabbits in 8-12 hours.

I. VON BORMANN, F. (1987). Hautreaktionen mit Filtraten der Staphylokokkenbouillonkulturen. [*Skin Reactions to Staphylococcus Filtrates*].—*Zbl. Bakt. I. (Orig.)*. **140**. 97-99.

II. FLAUM, A. (1988). *Studies in Staphylococci and Staphylococcal Immunity*. *Acta path. microbiol. scand.* Suppl. No. 35. pp. 187. 57 tables. [Numerous refs.] [In English].

I. A discussion of staphylococcus skin reactions considered as pure toxic and pure allergic phenomena.

II. A lengthy, experimental review of present-day knowledge of the genus *Staphylococcus*. Recent fundamental research on this group has been repeated experimentally and the following conclusions are recorded. F. considers that it is probably quite justifiable to classify strains as pathogenic if they coagulate rabbit plasma and ferment mannitol. The existence of distinct  $\alpha$ - and  $\beta$ -toxins is confirmed, and it is stressed that, whereas  $\alpha$ -toxin is only formed in the presence of  $\text{CO}_2$ , staphylococci do not require an increased  $\text{CO}_2$  tension for the formation of  $\beta$ -toxin. It is possible to separate  $\alpha$ -toxin from an  $\alpha\beta$  complex by heating.

The immunological significance of the  $\alpha$  and  $\beta$  antitoxins was studied and it was concluded that these antibodies have no bactericidal effect whatever. On the other hand, the presence of  $\alpha$ - or  $\beta$ -toxin can reduce the natural bactericidal power of normal serum. This phenomenon is due apparently to their leucocidal effect. From the foregoing it is concluded that any benefit which may accrue from toxoid immunization depends upon the protective action of the antileucocidins produced during the process.—E. J. PULLINGER.

HABS, H. (1987). Zur Frage der Enterokokkentypen. [*Types of Enterococci*].—*Zbl. Bakt. I. (Orig.)*. **140**. 94-96.

The ability to produce acetylcholine is a useful factor in the identification of enterococci, since only a limited number of varieties of organism can do this. Other acetylcholine-formers besides enterococci have been described, particularly in silage, but enterococci can generally be separated from such forms by their ability to split aesculin, their development in broth and litmus milk, and their bile-resistance. Enterococci do not all behave characteristically in all these tests, but strains can generally be identified if they behave characteristically in the majority of tests. Actually the enterococci can be divided into two main groups, namely the acetylcholine-formers which grow best in medium made from vegetable matter, and the non-acetylcholine-formers, which will tolerate animal protein. No acetylcholine-forming enterococci have been found to have any pathogenic action.

—E. J. PULLINGER.

KRANEVELD, F. C., & DJAENOEDIN, R. (1988). De beteekenis van het culturele onderzoek bij het stellen van de miltvuurdiagnose. [*Importance of Cultural Diagnosis of Anthrax*].—*Ned.-ind. Bl. Diergeneesk.* **50**. 206-210. 8 tables. [English and German summaries].

A comparison was made of the cultural and biological tests for anthrax, using sticks of plaster of Paris soaked with anthrax blood from goats which had been dead 24, 36, 48, 60 and 72 hours. It was found that the animal test was still necessary even when three plates were sown. For cultural diagnosis the glucose-blood-agar plate method (Zeissler) was found more reliable and rapid than the plain agar plate alone.—JAC. JANSSEN (UTRECHT).

PAGNINI, U. (1986). Sulla biologia del *B. anthracis*. A proposito dell' articolo di J. Basset: "La Bactérie charbonneuse en culture anaérobie" ("C. R. de la Soc. de Biol.", T. CXIII, 1933, p. 786). [*The Biology of B.a.*]—

*G. Batt. Immun.* 16. 876-885. [8 refs.] [English, French and German summaries].

P. found as a result of experiments, that, contrary to BASSET's findings [*V. B.* 4. 200], *B.a.* will not produce spores in strictly anaerobic cultures, though it does grow scantily and loses its Gram-positive character.

WEIDENMÜLLER, H. (1937). Desinfektionsversuche bei Milzbrand mit Stoffen, wie sie im Ablauf des Gerbprozesses benützt werden oder abfallen. [**Disinfectant Trials with Tanning Materials on Anthrax Bacilli**].—*Münch. tierärztl. Wschr.* 88. 409-416. 13 tables. [Numerous refs.]

Anthrax can be spread during and after the process of tanning hides by the discharge of bacilli into the rivers with the tannery waste, by manure composed of the sludge from tanning pits and through the medium of tanned leather.

W. carried out tests on the viability of anthrax bacilli during tanning processes. Pieces of silk infected with *B. anthracis* were still infected after being passed through the whole tanning process together with hides. Infected silk threads steeped in a mixture of lime and sodium sulphide were still virulent up to 46 days. Such threads immersed in pickling solutions composed of salt, sulphuric acid and water remained virulent for as long as 114 hours. Placed in chrome tanning mixtures they were still infective for as long as 118 hours, for 112 hours in the supernatant fluid, and for 136 hours in the sediment. In chromalum mixture the bacillus survived for 27 days and in "chromosal" mixture for 22 days. Infected threads, placed in tanning mixtures which were put into a pit and allowed to separate into a sediment and supernatant fluid, were infective for 41 days in the sediment and for 32 days in the fluid. The addition of milk of lime to tanning sediment shortened the time of survival of anthrax bacilli therein. It is therefore recommended that milk of lime should be added to tanning pit sediment before it is sold for fertilizing purposes.—A. W. MÖLLER.

NAIK, R. N. (1938). **Dissemination of Anthrax Infection through Dirty Stagnant Pools**.—*Indian J. vet. Sci.* 8. 243-245. 2 figs.

Anthrax is enzootic in most districts of Bombay province. The disease is more commonly observed during the grazing season, but is by no means rare during April and May when no grazing is available.

In an attempt to trace the source of infection during the non-grazing period, samples of water were taken from two stagnant pools at which animals were watered, and 5 c.c. samples were injected into g. pigs. One g. pig died in three days, and its heart blood sown on agar gave a pure culture of *Bacillus anthracis*.—F. J. ANDREWS.

CARCIA, J. A. R. (1936). Estudo comparativo dos métodos de Ascoli, Sobernheim e Hruska, para a verificação do poder terapeutico do soro anti-carbunculo hemático. [**Titration of the Potency of Anti-Anthrax Serum**].—*Repos. Lab. Pat. vet., Lisboa.* 3. 115-128. 5 tables. [English and French summaries].

From experiments on 114 guinea pigs and rabbits, on which he compared the methods of Ascoli, Sobernheim, and Hruska for the determination of the potency of four anti-anthrax sera (two of Portuguese and two of foreign origin), C. was of the opinion that none of these methods was capable of giving potency evaluations which might be accepted internationally. He considers, however, that until a satisfactory method has been evolved, preference should be given to that of Sobernheim.

THIJN, J. W. (1938). Een morphologisch bloedonderzoek bij tuberculose van het rund. [**The Blood Picture in Bovine TB.**]—*Tijdschr. Diergeneesk.* **65**. 8-25. 1 table. [13 refs.] [English, French and German summaries].

A detailed account with protocols of the blood picture of 12 healthy and 25 tuberculous cattle. The changes in the latter were not striking, but affected animals usually had "degenerative anaemia", and sometimes leucopenia, monocytosis, or neutropenia. Toxic granules were only found in small quantities. The blood picture alone is not considered sufficient basis for diagnosis.

—JAC. JANSEN (UTRECHT).

CHARMOY, R. (1938). L'inspection du poumon tuberculeux chez les animaux d'espèce bovine. [**Examination of Lungs of Cattle for TB.**]—*Thesis, Alfort*. pp. 69. [Numerous refs.]

A description is given of routine abattoir inspection, and of the lesions of TB. in the lungs and associated organs. C. explains the methods by which the meat inspectors judge the carcass, in accordance with meat inspection regulations.

Details are given of the technique of collecting and examining bronchial mucus for presence of tubercle bacilli. It is concluded that no cases of pulmonary TB. in bovines can correctly be regarded as "closed"; in all cases, tubercle bacilli may be excreted either constantly or intermittently in bronchial mucus.—H. B.

I. FELDMAN, W. H., & BAGGENSTOSS, A. H. (1938). **The Residual Infectivity of the Primary Complex of Tuberculosis.**—*Amer. J. Path.* **14**. 473-490. 1 text fig., 6 figs. on 2 plates. [18 refs.]

II. —. (1938). **Endogenous Reinfection and Primary Complex.**—*Amer. Rev. Tuberc.* **38**. 791-793. [3 refs.]

I. The literature on human TB. shows no unanimity of opinion on the duration of the infectivity of the tuberculous primary complex; morphological evidence is not in itself a satisfactory criterion and should be supplemented by animal inoculation. An attempt was made to detect the presence of tubercle bacilli in such lesions by g. pig inoculation and cultural examination. Material was obtained at autopsy from 68 subjects dying from causes other than TB. In only one case were tubercle bacilli recovered—by both animal inoculation and cultural methods—and the organism was of the human type. The ages of the cases studied varied from 7 to 90 years.

The conclusion is drawn that encapsulated or sclerotic primary tuberculous foci seldom contain viable or virulent tubercle bacilli and that in the adult human being endogenous reinfection is improbable. The authors consider that histological evidence of activity in the primary tuberculous complex is not reliable evidence of infectivity and may possibly be due to silica, which is fairly constantly present in such foci.

II. In this short editorial, certain important criticisms are made of the previous article. "Primary complex" is a gross anatomical diagnosis and can be made only by examining the respiratory organs complete with their associated lymph nodes. There is considerable doubt as to whether many of the lesions examined by the authors of I. were primary tuberculous lesions; confirmation of this criticism is afforded by the photomicrographs. Again, it is doubtful whether the pathogenesis of reinfection can be best studied in individuals in which reinfection has not occurred. The fact that all except one of the lesions examined proved sterile probably explains the freedom of these persons from evidence of reinfection: the evidence presented does not prove, or even suggest, the improbability of endogenous reinfection. It merely shows that tuberculous lesions in man can heal and become free from viable or virulent tubercle bacilli.—E. G. WHITE.

SEIDELIN, G. (1937). **Experimental Investigations on the Correlation between the Chloride Content of the Organism and the Tuberculous Infection.**—*Acta path. microbiol. scand.* **14**. 15-23. 2 tables. [4 refs.] [In English].

Six rabbits infected with bovine TB. and three controls were divided into three groups. One group received normal rabbit food (turnips and oats), another a diet low in NaCl, and the third a diet containing ample amounts of NaCl. There was a definite significant rise in the chloride values of both serum and whole blood in the two latter groups, and these animals showed a less pronounced TB. infection on P.M. examination than those which were fed the normal diet, and in which there was no change in blood chloride values. No hypochloraemia was noticed in those rabbits which had large pulmonary TB. infections, and analysis of the tissues for chloride revealed no signs of chloride retention or depletion in any of the organs.—ALFRED EDEN.

KON, S. K., & MADDOCK, C. (1938). **Experiments on the Effect of Vitamin A Deficiency on the Resistance of Pigs to Tuberculous Infection from Naturally Infected Milk.**—*Vet. Rec.* **50**. 1693-1697. 5 tables. [11 refs.]

Two lots each of four pigs from the same litter were fed on a vitamin A-deficient ration consisting of :—barley meal 50 %, wheatings 35 %, extracted soya bean meal 8 %, meat meal 5 %, salt 0.5 %, and ground limestone 1.5 %. Each pig of one lot, at nine weeks old, received 5 ml. of vitamin A concentrate daily, containing 600,000 Moore blue units. At this time one of the pigs was slaughtered and measurement of the vitamin A content of its liver showed that its reserves were low.

About three months later, when the pigs of the control lot showed clinical signs of vitamin A-deficiency, both lots received as a daily addition to the diet 400 ml. of separated milk from a cow affected with mammary TB. The milk was thoroughly mixed and care was taken that no heavier infection with tubercle bacilli was given than might be found under ordinary farm conditions. Administration continued for about five months, when an intradermal tuberculin test was carried out; all gave reactions. The vitamin A-deficient pigs were in poor condition and moved with difficulty, and after a few days both lots were slaughtered. P.M. examination revealed equal and extensive tuberculous lesions in all pigs. Vitamin A estimations revealed that the liver stores of those on the deficient ration were completely exhausted.

It is concluded that the administration of vitamin A even in large doses does not increase the resistance of pigs to tuberculosis.—D. D. OGILVIE.

ROSA, A. (1937). Il bacillo tubercolare de tipo bovino nella tubercolosi pulmonare umana. [**Bovine Tubercle Bacillus in Human Pulmonary TB.**]—*Riv. Pat. Clin. Tuberc.* **11**. 237-242. [18 refs.]

Out of 147 cases of human pulmonary TB., mostly from around Bologna, the author found only one case of bovine type infection, by culture on Petraghani's medium and inoculation into rabbits.

- I. NIKOLIĆ, N. (1938). Experimentelle Studien über die Variationen des B. tuberculosis auf neuen synthetischen Nährböden Z. 28, Z. 24, Z. 25, Z. 26, Z. 30, Z. 37. [**The Variations of Mycobacterium tuberculosis on New Synthetic Media**].—*Zbl. Bakt. I. (Orig.)*. **141**. 66-72. 6 figs.
- II. LOCKEMANN, G. (1938). Zur Frage der eiweissfreien Nährlösungen für Tuberkelbazillen. [**Protein-Free Culture Media for Tubercle Bacilli**].—*Ibid.* **142**. 79-82. 1 table. [4 refs.]
- III. GRÓH, E. (1938). Ueber Versuche zur Trennung gemischter Tuberkel-

bazillenkulturen auf Nährböden von verschiedenem Alkalitätsgrad. [**Attempts to Separate Mixed Cultures of Tubercle Bacilli on Media of Different Alkalinity**].—*Ibid.*, 190-197. [3 refs.]

- IV. DAVY, P. E., & LEVADITI, J. C. (1938). Rôle de la centrifugation dans la recherche du bacille de Koch par les procédés d'homogénéisation. [**Use of Centrifugation for the Demonstration of Tubercle Bacilli with the Aid of Homogenization**].—*Ann. Inst. Pasteur*. 61. 300-312. 2 figs. 7 tables. [7 refs.]

I. A description of variations in colony morphology of bovine and human types of tubercle bacilli, when growing on different types of synthetic medium. N. considers that such variations are of definite practical value in distinguishing the two types from one another.

II. A description of a synthetic protein-free medium valuable for the cultivation of tubercle bacilli. The constituents are :—sodium di-hydrogen phosphate (crystals), 0.3 %; potassium di-hydrogen phosphate, 0.4 %; magnesium sulphate (crystals), 0.25 %; sodium citrate (crystals), 0.25 %; ferri-ammonium sulphate (crystals), 0.001 %; asparagine, 0.5 %, and glycerin, 2.5 %, all in distilled water. Sterilization is effected at 100°C. for one hour on three successive days, or at 105°C. for 30 minutes.

III. G. was unable to separate mixed cultures of bovine and human type of tubercle bacilli by cultivation on synthetic media of varying pH.

IV. The identification of tubercle bacilli in tuberculous sputum by microscopic or cultural examination, or by animal inoculation, is facilitated by the breaking up of clusters of organisms and their even distribution throughout the material to be examined. A technique for the homogenization of debris-containing sputum is described. After homogenization, concentration of the organisms is best effected by centrifugation at 3,000 r.p.m. for 30 minutes.—E. J. PULLINGER.

SARTORI, C., & BONEZZI, G. (1936). Sulla eliminazione per via renale dei bacilli tubercolari nei bovini vaccinati col B.C.G. [**Excretion of Tubercle Bacilli by Cattle Vaccinated with BCG**].—*Boll. Soc. med.-Chir. Pavia*. 50. 145-168. 1 table. [Numerous refs.]

Ten rabbits were inoculated intravenously with 25 mg. of BCG each, and ten days later with 1 mg. of virulent tubercle bacilli. The urinary meatus was closed, and every 24 hours the urine was removed with a cannula through the abdominal wall and tested by g. pig inoculation and cultivation on Löwenstein's medium, but no tubercle bacilli were found. The rabbits usually died very quickly. Another series of experiments on rabbits and a third series on four calves, using a catheter to remove the urine, also failed to reveal the presence of any bacilli in the urine.

SIMONELLI, A. (1936). Contributo allo studio della endocardite da bac. *Pyogenes* nei bovini. [**Endocarditis caused by *Corynebacterium pyogenes* in a Calf**].—*Profilassi*. 9. 92-96. 5 figs. [17 refs.]

S. describes a case of endocarditis in a calf at an abattoir; there were also lesions in the liver, kidneys and spleen. From the macroscopic and microscopic examinations S. concludes that the causal organism was *Corynebact. pyogenes*. No cultures were grown.

- I. BUCHHOLZ, G. (1937). Interferometrische Untersuchungen über die Wirkung von Rotlaufbazillen auf Rotlaufimmenserum. [**Interferometric Tests on the Action of *Erysipelothrix rhusiopathiae* on Homologous Antiserum**].—*Inaug. Diss., Berlin*. pp. 19. Numerous tables. [Numerous refs.]

II. BRAMM, G. A. (1937). Ueber die Virulenz der saprophytisch in den Tonsillen des Schweines vorkommenden Rotlaufbakterien. [**Virulence of *E.r.* Existing Saprophytically in the Tonsils of Swine**].—*Inaug. Diss., Berlin*. pp. 15. 4 tables. [Numerous refs.]

I. Using the interferometric method—an optical method for demonstrating changes resultant upon the lysing of bacteria in a suspension—on bacillus-antiserum mixtures, the author sought for the presence in swine erysipelas immune serum of a factor capable of destroying the bacilli. He found that in the normal serum of bovines, horses, swine, or rabbits there was no such bactericidal factor, but that antiserum from horses or rabbits lysed both the living and dead bacilli. The action was quite specific.

II. From the tonsils of all of 50 healthy swine examined, B isolated six strains of *E.r.* which were highly virulent to mice, and which could not be differentiated by their cultural or biochemical characters from *E.r.* pathogenic for pigs or from *Pasteurella muriseptica*.

RADVILA, P. (1936). Zur aktiven Immunisierung gegen Schweinerotlauf mit virulenten Rotlaufglucosidkulturen. [**Immunization against Swine Erysipelas with Glucoside Cultures**].—*Wien. tierärztl. Mschr.* 24. 603-604.

R. experimented on the use of glucosides, added to S.E. cultures, as means of immunizing rabbits, pigeons and swine against S.E. The vaccines prepared were not good.

DE MOULIN, F. (1938). Onderzoek naar den aard der immuniteit tegen haemorrhagische septicaemie. [**The Nature of Immunity against Haemorrhagic Septicaemia**].—*Ned.-ind. Bl. Diergeneesk.* 50. 212-237. 3 figs.

After a virulent strain of *Pasteurella bovisseptica* had been injected subcutaneously into rabbits, buffaloes and goats, histological examination revealed that the bacilli were not phagocytosed by the leucocytes, but were destroyed by endothelial and epithelioid cells. This occurred in unimmunized as well as in immunized animals. Injection of bacilli alone gave hardly any immunity, but injection of a heat-killed broth culture was effective. A culture filtrate also produced an effective immunity. The best immunity was obtained with centrifuged formolized broth cultures. M. concludes that the character of the immunity is not antibacterial but anti-aggressive.—JAC. JANSEN (UTRECHT).

KESSENS, B. H. (1936). Vergelijkend onderzoek betreffende *Haemophilus coryzae*, *Haemophilus influenzae* en andere haemophiele bacillen. [**Comparison between *H.c.* and *H.i.***].—*Thesis, Utrecht*. pp. xi+124. 4 figs. on 2 plates, numerous tables. [Numerous refs.]

There is some morphological difference between *H.c.* of fowls and *H.i.* The latter are a little thicker, while colonies of *H.c.* are always smaller than those of *H.i.*; the largest colonies are obtained on "chocolate agar". *H.c.* does not survive for more than two weeks in culture tubes, while *H.i.* survives for four weeks. The best solid culture medium is 200 c.c. of sterilized agar to which 100 c.c. of sterile blood are added, the whole being heated at 65°C. for ten minutes. The best liquid medium is 10% blood broth containing a piece of raw potato. The most satisfactory pH is 7.4.

*H.c.* requires the V factor, but not the X factor. A thermolabile factor, called C, is believed to be necessary. This C factor occurs in blood-cells, in some sera, and in potato. Only a slight relationship in the antigenic structure of the two species was found. *H.c.* could only be cultivated from cases of coryza with

a short incubation period. These cultures produced coryza in fowls after an incubation period of 1-2 days.—JAC. JANSEN (UTRECHT).

NORDLUND, Ingrid. (1988). Några undersökningar angående råttor som smittospridare vid vissa djurparatyfoser. [**Rats as Spreaders of Animal Paratyphoid Bacteria**].—*Svensk VetTidskr.* 43. 172-180. [17 refs.]

During recent years outbreaks of salmonella infection in farm animals have been frequently recorded in Sweden. In some of them evidence has incriminated rats as either the source or the transmitters of the infection. Four such cases are here reported.

Sixteen lambs of a flock numbering 68 died suddenly after having been fed on wheat which was heavily contaminated with rat droppings. Two lamb carcasses were examined P.M. and the cause of death was found to be *S. enteritidis* var. *dublin*. The same type of organism was shown to be present in the grain, and also in the alimentary canal of two rats which were caught on the premises.

In two herds scours in calves was found to be due to *S.e.* var. *dublin* infections. In five of ten rats captured on the one farm and in one rat captured on the other the homologous type of salmonella organisms was demonstrated.

Similar observations were made in an outbreak of *S. typhi-murium* infection in the laboratory stock of g. pigs.

Finally data are given which show that rats experimentally infected with *S.t.-m.* may transmit the infection to healthy g. pigs if the latter are housed in cages where the rats have been kept, or if their bedding is contaminated with intestinal contents from rats so infected.—GUSTAV NAERLAND (OSLO).

MARCATO, A. (1936). Colibacillosi con manifestazioni di corizza nei polli della colonia Eritrea. [**Fowl Coryza in Eritrea**].—*Nuova Vet.* 14. 235-243, and 272-275. 8 figs., 1 table.

Three fowls of the flock at the Serum and Vaccine Institute in Eritrea were found to be affected with coryza. They all died, but there were no further cases. Microscopic examination of smears of nasal exudate showed a large number of Gram-negative coliform bacteria. In cultures from material from the eyes and hearts of the birds on ordinary media coliform organisms were obtained.

After experiments on the infection of fowls with tissue material taken directly from the three original birds, other fowls were inoculated in various ways with cultures from this material. In most cases conjunctivitis with ocular and nasal secretions followed and also some loss in weight, but there were no deaths. In most cases *Bact. coli* was cultivated from the heart.

M. concludes that there exists in Eritrea an infectious disease of fowls with clinical and pathological symptoms similar to those of infectious coryza and which is caused by an organism of the *coli-aerogenes* group. It causes a generalized infection, of which the coryza is one manifestation.

CARROL, A. N. (1988). **The Practitioner's Summary of Current Opinion on Bang's Disease.**—*J. Amer. vet. med. Ass.* 93. 244-248.

In C's opinion, a survey of the methods of control of Bang's disease would seem to show that an effective and practical policy must embrace both blood-testing and vaccination, that blood-testing and elimination of reactors are an excellent beginning, but that calf vaccination and immunization are worthy of a place in a control plan.

In Virginia the percentage of reactors dropped from 9.7% to 1.5% in two

years as a result of the work undertaken. Vaccination of calves and heifers has given good results, but its value in the case of mature animals is doubtful.

—D. D. OGILVIE.

CHAMBERS, F. (1938). **Clinical Manifestations of Brucellosis Associated with Farm Stock.**—*Vet. Rec.* 50. 1106-1110. [9 refs.]

A general discussion; there is no new material.—BRENNAN DEVINE.

- I. LÜHRS, E. (1938). Einfluss saurer und alkalischer Nahrung auf die Abortus Bang-Infektion und auf Agglutininbildung. [**The Influence of Acid and Alkaline Diets on *Brucella abortus* Infection and on Agglutinin Formation.**]—*Z. InfektKr. Haustiere.* 53. 48-48. 6 tables, 1 graph.
- II. SANDHOLM, A. (1938). Ist die Ratte an der Verbreitung des ansteckenden Verwerfens mitbeteiligt? [**Role of Rats in the Spread of Bovine Brucellosis.**]—*Ibid.* 201-210. 5 tables. [9 refs.]
- III. MARIENBURG, H. (1938). Ueber die Folgen der Rinder-Brucellose und deren Bekämpfung. [**Effect of Bovine Brucellosis and Its Control.**]—*Dtsch. tierärztl. Wschr.* 46. 228-232. 2 figs., 3 tables. [Numerous refs.]
- IV. BISCHOFF, O. (1938). Ueber gehäuftes Auftreten von akuten Gelenkerkrankungen beim Rinde, verursacht durch *Brucella abortus* (Bang.) [**An Outbreak of Arthritis Associated with *Br.a.* in Cattle.**]—*Ibid.* 260-262. 2 figs., 1 table. [8 refs.]
- V. KARSTEN, & EHRLICH. (1938). Ist die Tilgung der Rinder-Brucellose erreichbar? [**The Possibility of Eradicating Bovine Brucellosis.**]—*Berl. tierärztl. Wschr.* May 18th. 274-277. 3 tables.

I. The author investigated the problem as to whether acid foodstuff (silage and certain concentrates) has an influence on the incidence of bovine brucellosis, and whether the disease is more rife in cattle on an acid diet than in those on a non-acid diet (natural pasture). He made observations on 1,000 cows for one year and found no evidence for the above supposition.

He also infected rabbits with *Br.a.* after putting them on acid and alkaline diets, but the diets had no influence on the infection as evidenced by the agglutinin response.

II. S. concludes that rats are very resistant to oral infection with *Br.a.*, but noted that after being fed this organism they excreted viable organisms in the faeces for a week or more, thus acting as mechanical carriers of infection.

III. An article to stress the heavy economic loss which accompanies *Br.a.* infection. It is shown that the trouble is not confined to the loss of a calf, but that milk is lost over several seasons. Experimental data are recorded in support of this statement.

IV. A clinical report of *Br.a.* infection in cattle associated with joint swellings. Out of 26 animals, 25 proved infected, and of these, five showed joint lesions. It was possible to isolate *Br.a.* from fluid extracted from the swollen joint of one animal.

V. The seriousness of contagious abortion is stressed. The disease can be combated and eliminated by following the usual precautions, but it is noted that there are occasional animals which carry and even excrete *Br. abortus*, but which do not give positive serological reactions. Such animals are a serious menace to the successful eradication of infection.—E. J. PULLINGER.

MC EWEN, A. D., & PRIESTLEY, F. W. (1938). **Experiments on Contagious Abortion. Immunisation Studies with Vaccines of Graded Virulence.**—*Vet. Rec.* 50. 1097-1106. 9 tables. [7 refs.]

The authors describe vaccination tests with an avirulent strain "strain 45" of *Brucella abortus* on g. pigs which confirm their previous investigations [V. B. 7. 61.], i.e., that the resistance of g. pigs to *Br.a.* could be increased by vaccination.

In two series of experiments female g. pigs were used and after they had been vaccinated, were allowed to breed. The animals were infected 74 days after vaccination, some subcutaneously and others by infection in the eye. The eye infection proved a more severe test than the subcutaneous inoculation. It was found that the variant showing the highest degree of virulence conferred the highest degree of protection.

The results further showed that resistance to *Br.a.* could be greatly increased by successive vaccinations with strains of gradually increasing virulence. The authors suggest that a similar method of immunization might be effectively adopted for cattle.—BRENNAN DEVINE.

STONE, W. S. (1938). **Brucellosis in Horses.**—*Cornell Vet.* 28. 91-98. 2 tables. [19 refs.]

The blood of 1,172 city horses, 205 country horses, and 185 hospital horses was subjected to the agglutination test for *Br. abortus*. In general, in the group examined, the incidence of agglutinins was low in healthy city horses, somewhat higher in healthy country horses, and highest in clinically affected horses (surgical diseases). Reactions at 1:50 or higher occurred in 9.6%, 28.9%, and 42.5% respectively. Agglutinins appear in clinically normal horses, and the titre is no indicator of either active or latent infection. It is suggested that there is a higher incidence of brucellosis in horses which make intimate contact with cattle and that, conversely, Bang's disease can be transmitted to cattle from horses.—D. D. OGILVIE.

ARIEL, M. (1937). K patologiceskoj morfologii brucelleznogo aborta ovec. [**On the Morbid Anatomy of Abortion of Sheep Caused by *Brucella melitensis*.**—*Brucellosis in Sheep.* pp. 129-149. 10 figs., 2 tables. [Numerous refs.] Moscow: Viem Publ. Dept.

The changes in the uterus of the sheep after abortion due to *Br.m.* are characterized by necrosis of the placenta and the subsequent repair of the necrotic areas by granulation tissue. Inflammation as a result of the infection apparently begins in the placenta during gestation, interfering with its normal development. Hyaline degeneration of the walls of the crypts and penetration of the necrotic areas by connective tissue prevent detachment of the placenta after abortion, and foci of infection develop in the uterine mucous membrane. Macrophages and giant cells of syncytium and Langhan's types collect, and the lesion is surrounded by a fibrous capsule.

Changes are also observed in the udder, lymph nodes, liver, spleen, adrenal glands and kidneys, the more important occurring in the liver and lymph nodes. In the liver, foci of hypertrophied Kupfer cells fill up the capillaries, and eosinophile leucocytes and giant cells are sometimes present. Necrosis of the centre of these foci is also well marked.

The focal character of the lesions appears most clearly in the liver and the uterine mucous membrane. In the lymph nodes the most conspicuous lesions are diffuse hyperplasia of the reticulo-endothelial cells; focal lesions, not of a necrotic character, occur in the cortex.

ARIEL, M. (1937). K patologiĉeskoj morfologii patentnogo brucelleza ovec. [**On the Pathological Morphology of Latent Sheep Brucellosis**].—*Brucellosis in Sheep*. pp. 157-176. 8 figs., 4 tables. [Numerous refs.] Moscow: Viem Publ. Dept.

In 1933, A. carried out autopsies on 24 ewes and seven rams which had given positive reactions to the agglutination test for brucella infection. He found that in infected sheep, there was a series of pathological changes in the lymph nodes, liver, udder and uterus.

The changes were most marked in the lymph nodes. There was a thinning of the cortical layer and an impoverishment in lymphocytes: the pith strands contained plasma cells. Large numbers of polynuclear cells were present, and there was hyperplasia of the reticulo-endothelial cells which often resulted in the formation of granulomatous nodules.

Granulomatous nodules were also found in the mucous membrane of the uterus of ewes that had not aborted; they were composed of epithelioid and giant cells, unlike nodules that occur in the mucous membrane after abortion, the latter being composed of large polynuclear cells with leucocytic infiltration and necrosis at the centre. There was diffuse hyperplasia of Kupfer's cells of the liver, but nodules were rarely found in this organ. The spleen sometimes showed reactive centres with cells in the process of mitosis; this reaction also occurred in the cortical layer of the lymph nodes. The udder and kidneys were fairly constantly affected, and the inflammatory lesions of the interstitial tissue of these organs explain the excretion of brucella organisms in the urine and milk of affected animals over long periods.

It was not decided whether certain suppurative lesions that were encountered were due to brucella or not.

- I. DALRYMPLE-CHAMPNEYS, W. (1938). **Undulant Fever**.—*Lancet*. 325. 926-928. [10 refs.]
- II. JOÓ, Ilona. (1938). Ueber Banginfektionen bei Menschen. [*Brucella abortus Infection in Man*].—*Zbl. Bakt. I. (Orig.)*. 141. 149-153. [Numerous refs.]
- III. HIROKI, H. (1938). Epidemiologische Beobachtungen bei der Brucellosis des Menschen in Japan und in Mandschukuo. [**Human Brucella Infection in Japan and Manchukuo**].—*Z. ImmunForsch.* 92. 382-391. 2 tables. [16 refs.]

I. A brief review of the subject of U.F. to show that such a disease does exist in England and Wales and is sufficiently serious to warrant careful consideration. Those interested are referred to the original, but the following points are of general interest :—

(a). It is considered that WILSON's estimate [(1932). *Vet. Rec.* 12. 1226.], that 400-500 cases of U.F. occur annually in Great Britain, is not an exaggeration of the true position.

(b). Diagnosis in man depends primarily upon the agglutination test, and since "prozones" occur, a long series of serum dilutions should always be put up. ["Prozone" is the term applied when the tubes containing low serum dilutions in a serological test give negative readings while tubes containing higher dilutions show positive reactions]. Whilst a positive agglutination reaction is conclusive, a negative reaction early in the illness does not rule out the presence of U.F. Whenever possible, blood culture should be carried out, as in this way cases may be discovered early when the bacteraemia is in progress. Where clinical evidence favours the existence of U.F., but the aggl. test is negative, a brucellin skin test should also be made.

(c). The source of infection is nearly always direct contact with infected live animals, contaminated litter or excreta, or by the consumption of contaminated raw milk. To explain why so few cases of U.F. occur, when so much contaminated raw milk is drunk, the work of GARROD [*V. B.* 8. 763.] is quoted. G. found that *Br. abortus* is highly susceptible to the action of the acid gastric juices, and he suggests that *Br. a.* can only pass through the stomach alive if the consumer is for any reason suffering from gastric hypo-acidity.

II. Of 16,301 samples of human serum collected in Budapest for typhoid tests, 21 samples gave positive reactions when tested for *Br. a.*, indicating that the persons from whom these samples were collected were affected with U.F. A further 7.9% of the total number of samples gave slight positive aggl. reactions with this organism, indicating the probability that these were latent or waning cases of infection.

III. Such figures as are available are quoted. These tend to indicate that, in Japan and Manchukuo, contagious abortion of cattle and *Br. a.* infection in man are about as prevalent as in Europe and America. *Br. melitensis* infection has not been encountered in the Orient.—E. J. PULLINGER.

GIULIANI, V. (1936). Ricerche sulla differenziazione delle "Brucelle melitensis, abortus bovis ed abortus suis" mediante la cultura in terreno di Petraghani. [*Differentiation of Brucella on Petraghani's Culture Medium*].—*Nuova Vet.* 14. 205-209.

Using 145 strains of brucella, comprising 81 strains of *Br. m.*, 51 strains of *Br. a.* and 7 of *Br. s.*, the author tested the de Santis method for differentiation on Petraghani's egg medium [*V. B.* 4. 503, 5. 797, 6. 499, and 7. 11]. He concludes that it is the best method of differentiation of *Br. m.* and *Br. a.* and that by cultivation on media with and without malachite green *Br. s.* can also be differentiated.

ZORZOLI, G. B. (1936). Differenziazione delle Brucelle. Studio sul ricambio del zolfo e sul diverso comportamento delle Brucelle in terreno di Petraghani e Löwenstein. [*Cultural Differentiation of Brucella*].—*Nuovo Ercol.* 41. 354-371. 6 tables. [Numerous refs.]

After experiments on 50 strains of *Br. abortus*, *Br. melitensis* and *Br. paramelitensis* from various sources, Z. states that the production of  $H_2S$  is a reliable guide for the differentiation of brucella strains. Cultivation on Petraghani's medium and on Löwenstein's media is a simple method for differentiating *Br. a.* and *Br. m.* *Br. m.* and *Br. paramelitensis* grow more rapidly in Löwenstein's medium with congo red added than on the other media.

CASANOVA, F., & PELOSO, M. T. (1936). Ricerche sui caratteri culturali di vari stiptipi di Brucella. [*The Cultural Characters of Various Strains of Brucella*].—*G. Batt. Immun.* 16. 361-372. 1 fig., 1 table. [15 refs.] [English, French and German summaries].

The authors observed the cultural characters of 66 strains from various sources, of *Br. abortus*, *Br. para-abortus*, *Br. melitensis* and *Br. paramelitensis*, grown on the egg media of Petraghani, Bruschettini, and Löwenstein and on plain agar and liver agar, with and without thionin. The results are given in a table. They conclude that the property of producing  $H_2S$  is the best method of differentiation between human and bovine strains [presumably means between *abortus* and *melitensis*] and that Huddleson's thionin method is the best of those based on bacteriostasis, but that the thionin must be chemically pure and not exposed to light or air for a long period. Cultivation on egg media is less reliable, but the inhibition of the growth of *abortus* is greatest on Petraghani's medium.

KLIMMER, M. (1988). Zur selektiven Züchtung der Abortus-Bang-Bakterien aus einem an Begleitbakterien reichen Material (Milch). [**The Selective Cultivation of *Brucella abortus* from Milk**].—*Arch. wiss. prakt. Tierheilk.* **73**. 925-959. 18 tables. [Numerous refs.]

K. discusses the dispersion of brucella organisms in the constituent parts of milk. While gravity cream is the most suitable single fraction to use for this demonstration, it contains only about a quarter of the organisms present in the whole milk. A mixture of gravity cream and sediment, emulsified in whole milk, is the best source of material for such study. Concentration by agglutination is useless, possibly owing to the slow rate of agglutination.

After studying the value of a large number of selective agents for use in cultural work, K. concluded that malachite green, gentian violet, victoria blue and zephirol are the most useful. The use of the first two is well known. Victoria blue should be used in a concentration of 1:20,000 and zephirol in a concentration of 1:10,000. Victoria blue has one advantage over zephirol in that it slightly colours brucella colonies, thus distinguishing them from fat droplets.—E. J. PULLINGER.

SARNOWIEC, W. (1988). Sur l'apparition des formes filtrables de *Brucella abortus* (*Brucella bovis*) dans des milieux additionnés de tuberculine. [**Appearance of Filtrable Forms of *Br. abortus* on Media Containing Tuberculin**].—*C. R. Soc. Biol. Paris.* **129**. 129-132. [3 refs.]

Filtrates through Chamberland L2, L3 and L5 candles of cultures of a bovine strain of *Br.a.*, grown on ordinary media containing tuberculin, were injected subcutaneously and intraperitoneally into groups of three g. pigs each, and produced agglutinating titres of 1:300 to 1:400 for *Br.a.*, as well as lesions typical of *Br.a.* infection. Filtrates from cultures grown in the absence of tuberculin provoked agglutinins in a titre of 1:30, with very slight evidence of infection. Stained tissue smears obtained from typical lesions that developed after injection of the filtrates showed no visible bacteria, and sub-culture was unsuccessful.—R. O. MUIR.

SIEVERT, Lena. (1986). Untersuchungen über den Antigenaufbau in der Brucella-gruppe. [**Brucella Antigens**].—*Z. Immunforsch.* **89**. 249-259.

S. studied the antigenic structure of the brucella group and reached the same conclusions as WILSON and MILES [*V. B.* **2**. 488], namely that *Br. melitensis* and *Br. abortus* have two common antigens, but that *Br.m.* antigen predominates in *Br.m.* strains, and *Br.a.* antigen in *Br.a.* strains.

The work of S. differs from that of other workers in that she was able to absorb all antibodies from *Br.m.* antiserum with *Br.a.* antigen, whereas she could not absorb all antibodies from *Br.a.* antiserum with *Br.m.* antigen. This suggests that *Br.a.* (and *Br. suis*, which behaved similarly) contain not only all the *Br.m.* antigens but an extra one as well. [This work should be repeated with freshly isolated smooth strains of brucella, and if then confirmed it will be of considerable diagnostic importance].—E. J. PULLINGER.

MASHETER, J. W. H. (1988). **Enterotoxaemia of Sheep**.—*Vet. J.* **94**. 480-491.

M. records the occurrence of enterotoxaemia in three flocks of sheep which were folded on arable land. The mortality varied from 9.6% to 28.8%. From intestinal material a toxin was demonstrated which was neutralized only by *Clostridium welchii* Type D antitoxin.—R. FISHER.

ROSSI, P. (1989). L'urée sanguine dans les entéro-toxémies et les complications gangréneuses des traumatismes du cheval. [**Blood Urea in Enterotoxaemia**

**and Gangrenous Conditions in the Horse].—C. R. Soc. Biol. Paris. 130. 614-615. [1 ref.]**

Blood tests were carried out on ten horses affected with certain icteric conditions, which R. infers were associated with enterotoxaemia or wound gangrene due to organisms of the gas gangrene group, principally *Clostridium septicum*. There was a considerable elevation of blood urea, the level rising from the normal 0.40-0.45 g. to as high as 1.95 g. Parallel with this there was a slight fall in serum chlorides.—N. J. SCORGIE.

COBURN, D. R., & QUORTRUP, E. R. (1938). **Atypical Botulism in Turkeys.**—*J. Amer. vet. med. Ass.* **93.** 385-387. 2 figs.

An outbreak of botulism in a flock of turkeys which had access to stagnant water is recorded. Affected birds showed posterior paralysis, dyspnoea, slight cyanosis, and occasionally conjunctivitis, but the pathognomic sign of paralysis of the membrana nictitans was absent. The only P.M. lesions were petechiae of the auricular epicardium and hyperaemia of the duodenal mucosa. Diagnosis was confirmed by the toxic action of filtered water samples upon mice and the isolation of *Clostridium botulinum* (Type C) from near-by soil. *Cl.b.* antitoxin Type C was used successfully in treatment, and the outbreak ceased when the flock was moved to new land.—D. D. OGILVIE.

KLIGLER, I. J., GUGGENHEIM, K., & WARBURG, F. M. (1938). **Influence of Ascorbic Acid on the Growth and Toxin Production of *Cl. tetani* and on the Detoxication of Tetanus Toxin.**—*J. Path. Bact.* **46.** 619-629. 6 figs., 5 tables. [6 refs.]

The addition of ascorbic acid to a peptone meat extract broth enables *Cl. tetani* to be grown aerobically. The amount required varies with the concentration of peptone, but in any case the minimum is 0.5 parts per thousand. The presence of the vitamin in the medium inhibits the production of, or detoxicates, toxin, and the resulting cultures are only 1/4 to 1/10 as toxic as controls. The detoxicating effect of the vitamin is also shown on toxin solutions and is thought to be due to concentration of the vitamin and toxin followed by the oxidation of the resultant mixture.—P. S. WATTS.

- I. SOUTO, A. B., & LIMA, C. (1938). Action de la vitamine C sur la toxine du vibron-septique. [**Action of Vitamin C on the Toxin of *Clostridium septicum***].—*C. R. Soc. Biol. Paris.* **129.** 79-82. 3 tables.
- II. SOUTO, A. B., & LIMA, C. (1938). Action de la vitamine C sur la toxine du *Bacillus oedematis*. [**Action of Vitamin C on the Toxin of *Cl. oedematis***].—*Ibid.* 763-766. 3 tables. [8 refs.]
- III. SOUTO, A. B., & LIMA, C. (1938). Action de la vitamine C sur la toxine du *Bacillus histolyticus*. [**Action of Vitamin C on the Toxin of *Cl. histolyticus***].—*Ibid.* 767-769. 3 tables.

I. Three intramuscular injections of vitamin C (ascorbic acid) gave 61 mice a considerable resistance to an intravenous injection of the toxin of *Cl.s.* A single dose of the vitamin injected into 80 mice 1.5 hours after 1.2 M.L.D. of toxin produced irregular antitoxic action, while repeated doses injected after one- and three-hour intervals protected five mice against 1 M.L.D. of toxin, but not against 2 M.L.D. Intravenous injection of vitamin-toxin mixtures into 80 mice demonstrated that neutralization obeyed the law of multiple proportions and increased in degree with the contact period.

II. Vitamin C increased the resistance of 46 mice to the toxin of *Cl.o.* and

a single dose injected up to two hours after the toxin produced a feeble antitoxic action in 28 mice and none at all in 14 mice injected five hours after the toxin. Repeated doses of vitamin at one- and three-hour intervals after injection with 1 M.L.D. of toxin protected seven out of eight mice, but against 2 M.L.D. they were inactive in eight other mice. The neutralizing power of vitamin C was well demonstrated in 60 mice injected with vitamin-toxin mixtures, and increased with prolonged contact.

III. Vitamin C had an apparent prophylactic effect upon 80 mice against the injection of 1-2 M.L.D. of the toxin of *Cl.h.* In ten mice its antitoxic action against 1-2 M.L.D. of toxin lasted up to one hour after injection of toxin and disappeared after two hours. Repeated doses of vitamin at one- and three-hour intervals after injection of 1-2 M.L.D. of toxin gave no protection in ten mice. Marked neutralization of the toxin in mixtures with vitamin was illustrated in 40 mice, but did not obey the law of multiple proportions and did not increase with prolonged contact.—R. O. MUIR.

BAKOS, M. (1934). Vizsgálatok a baktériumok elfajulásának okairól. [Investigations on the Causes of Degeneration of Bacteria].—*Közl. Oesszegas. élet-és kórtan Köréből*. 26. 249-262. 8 figs., 5 tables. [Numerous refs.]

Different forms of degeneration of the bacteria were often observed in cultures of *Salmonella cholerae-suis*, *Pasteurella aviseptica*, *Bacillus anthracis*, *B. pseudanthracis*, and *Erysipelothrix rhusiopathiae* on agar plates containing 2.5% lithium chloride with or without 4% sodium chloride. This was considered to be affected by the hypertonicity or hypotonicity of the culture medium, by the toxic action of the combined chemicals, and also by the liberated products of the decomposition of the dead bacteria. Nothing could be demonstrated in the cultures to indicate that the changes were due to any other cause.—G. SÁLYI (BUDAPEST).

- I. RAO, M. A. N. (1938). Rhinosporidiosis in Bovines in the Madras Presidency, with a Discussion on the Probable Modes of Infection.—*Indian J. vet. Sci.* 8. 187-198. 14 figs. on 4 plates. [14 refs.]
- II. SAHAI, L. (1938). Rhinosporidiosis in Equines.—*Ibid.* 221-223. 5 figs. on 2 plates. [5 refs.]

I. Four previous reports of the occurrence of rhinosporidiosis in animals are quoted, and record is made of the finding of the disease in 18 bovines and one pony in Madras Presidency, during a period of six years, in districts where the disease is fairly frequently observed in man.

In all cases lesions were confined to the lower third of the nasal septum, and developed in connexion with some previous trauma. In about 50% of cases, lesions of nasal schistosomiasis were also present.

The clinical features and histology of the lesions are described, accompanied by some excellent photomicrographs of sections of the rhinosporidial tumour and of spores in nasal discharge. The causal parasite appears to be identical with that found in man. R. discusses the nature of the fungus and the probability of a saprophytic existence, and describes the method of cultivating it artificially.

All attempts to produce the disease by direct transmission of spores from a diseased to a healthy animal failed, and it is suggested that natural infection is probably brought about by dust-borne spores from a saprophytic phase in the life-history of the fungus.

II. Previous reports of rhinosporidiosis in animals are quoted, and the article records a case of the disease in a pony in Orissa Province, where the disease would appear to be rare. A description of the lesion is given.—F. J. ANDREWS.

## DISEASES CAUSED BY PROTOZOAN PARASITES

ARGUN, T., & OEKTEM, Z. (1937). Memleketimiz hayvanlarında surra. [**Surra in Turkey**].—*Askerî tıbbî baytarî mecmuası*. **131**. 869-880. 2 figs. [6 refs.] [French summary]. [Abst. from abst. in *Tierärztl. Rdsch.* **43**. 700].

This disease occurred in camels in Palestine in 1915, and later in Irak and Syria, with a high mortality. In 1923, after the Turkish War of Independence, it was diagnosed in some camels and Indian buffaloes in Ankara during rinderpest investigations.

RECEVEUR, A. E. F. (1938). Notes sur certaines affections du cheptel des régions nord-est du Tchad. [**Camel Trypanosomiasis in the Area North-East of Lake Chad**].—*Rec. Méd. vét. exot.* **11**. 118-118.

In investigating disease of stock in this area, R. encountered a disease of camels which he ascribes to infection with a trypanosome of the *Tryp. evansi* group. The disease, which is called "dioufar" by the natives, is characterized by progressive emaciation without loss of appetite, while P.M. there is emaciation without other pathognomic lesions. It is estimated that about 10% of the camel population is affected, and the annual mortality is about 3%, affected animals living about three years. Detection of the disease was found to be very difficult, the appearance of trypanosomes in the peripheral blood being irregular, and the sublimate test unreliable.

Treatment with naganol in doses of 5-7 g., given intravenously, was always ineffective as a cure; temporary improvement might result, but finally the animals relapsed and died. It is thought that infection is transmitted by tabanids or *Stomoxys*.—U. F. RICHARDSON.

PACKCHANIAN, A. (1938). Susceptibility and Resistance of Various Species of *Peromyscus* (American Deer Mice) to Infection with *Trypanosoma Hippicum* and the Possibility of Certain "Wild Mice" being Reservoir Hosts to Pathogenic Trypanosomes.—*Amer. J. trop. Med.* **18**. 587-593. [17 refs.]

It was found that some species of deer mice might survive infection with *Tryp. hippicum* [*Tryp. evansi* of the Panama Canal area] for as long as 250 days. A similar observation had already been made in respect of infection with *Tryp. brucei* [see *V. B.* **4**. 759]. It is suggested that mice may act as reservoir hosts of *Tryp. hippicum* and also of *Tryp. brucei*, and possibly other pathogenic trypanosomes, but no other evidence is produced in support of the suggestion.—U. F. R.

VLACH, G. (1936). La leishmaniosi canina in Trieste e provincia. [**Canine Leishmaniasis in Trieste**].—*Arch. ital. Sci. med. colon.* **17**. 513-541. 12 tables.

V. examined 115 dogs of different breeds—presumably taken at random—in Trieste and the surrounding province for various infections, and found that nine were infected with leishmaniasis. The spleen was somewhat enlarged in 8 of the dogs and normal in one. Details are given of the results of the examination of each dog. None of the dogs was affected with skin lesions.

MERTENS, W. K. (1938). Over het voorkomen van *Leptospira icterohaemorrhagiae* bij katten. [***L.i.* Infection in Cats**].—*Ned.-ind. Bl. Diergeneesk.* **50**. 78-79.

A note drawing attention to the work of ESSEVELD and COLLIER [see next abstract].—JAC. JANSEN (UTRECHT).

- I. ESSEVELD, H., & COLLIER, W. A. (1988). Leptospirose bei Katzen auf Java. [**Leptospirosis of Cats in Java**].—*Z. Immunforsch.* **93**. 512-528. 6 tables. [Numerous refs.]
- II. ESSEVELD, H., & COLLIER, W. A. (1988). Leptospirosis bij katten to Batavia. [**Leptospirosis in Cats in Batavia**].—*Eijkman Instituut, Batavia, 1888-1938*. p. 250. [Abst. from abst. in *Zbl. Bakt. I. (Ref.)* **131**. 818].
  1. The authors examined the serum of 500 cats in Java for agglutinins for *L. bataviae*, *L. javanica* and a few other strains, and prepared cultures from the kidneys of these animals on Noguchi's medium. Fourteen pure cultures of a leptospira were obtained, all coming from 843 large cats over 1.5 kg. in weight. Eighty of 810 large cat sera were positive in the aggl. tests, and gave rise to high titres against the two Dutch East Indian species of leptospira. The 14 cultures were typed serologically: eight proved to be *L.b.* and six *L.j.*
  - All the small young cats examined were found to be free of infection, but the results suggest that nearly one-third of all full-grown cats in Java are infected.
  - II. Five strains of leptospira were isolated from the kidneys of 96 adult cats in Batavia. All strains proved to be identical with the human and rat Batavia type, this showing that cats are concerned only to a small extent in the epidemiology of human leptospirosis. From the results of aggl. and lysis tests with the serum of 190 cats the authors are led to believe that over one-quarter of all adult cats in Batavia are carriers of infection.—J. E.

PRATT, I. (1937). **Excystation of the Coccidia, *Eimeria tenella***.—*J. Parasit.* **23**. 426-427.

P. describes methods and attempts to induce excystation of the oocysts of *E.t.* *In vivo* experiments were conducted to determine the positions in the alimentary canal at which excystation occurred. An interesting and original observation concerned the excystation of oocysts in chicken's crops. This was observed among eight birds on three different occasions, and in some cases excystation occurred within five minutes. *In vitro* experiments carried out with sporulated oocysts treated with extracts of crop, proventriculus, duodenum, and pancreas, in addition to commercial pancreatin, were not successful. [The failures to produce excystation *in vitro* far outnumbered the successes].

In contrast to the view that the sporozoites are liberated from the spore within the oocyst and leave the cyst by the micropylar end, P. concludes that the spore is freed from the oocyst before the sporozoites break from the spore. [Some observations recently carried out in Great Britain would appear to support this conclusion].—C. HORTON SMITH.

LEVINE, P. P. (1988). ***Eimeria hagani* N.sp. (Protozoa: Eimeriidae). A New Coccidium of the Chicken**.—*Cornell Vet.* **28**. 268-266. [4 refs.]

A new coccidian species from the duodenum and intestine of the chicken is described and has been named *Eimeria hagani*. A mixture of this species and *E. maxima* was originally obtained from scrapings of the intestine, and pure cultures of the new species were obtained by feeding single oocysts to coccidia-free birds. The oocysts are described as broadly oval, with protoplasmic contents which almost fill the oocyst shell. In 1.5% potassium bichromate, sporulation occurred in 24-48 hours at 30°C. The sporulated oocysts measure  $19.1\mu \times 17.6\mu$ . As the entire life-cycle of this species is confined to the duodenum and small intestine, it can easily be differentiated from *E. tenella* and *E. necatrix*. The first occurrence of oocysts in the faeces is, like that of *E. maxima*, more than six days after infective feeding, but as the morphology of the oocysts is widely different it is a simple

matter to distinguish them. Experiments with birds immunized against the previously known species showed that the birds could be successfully infected with the new species, while, conversely, birds immunized against *E. hagani* were infected with the others. Haemorrhagic spots occur in the wall of the duodenum and intestine of most infected chickens, while in severe infections there is catarrhal enteritis, and the formation of mucous casts.—C. HORTON SMITH.

ELLIS, C. C. (1938). **Studies of the Viability of the Oocysts of *Eimeria tenella*, with Particular Reference to Conditions of Incubation.**—*Cornell Vet.* 28. 267-274. 3 tables. [13 refs.]

This investigation was undertaken with a view to proving or disproving the speculation that oocysts, carried on the egg-shell during incubation, might remain viable and infect the newly hatched birds. Several interesting facts emerged; e.g., sporulated oocysts on egg-shells remained viable for 28 days at a temperature of 9.8°C., for 8 days at 19°C., and for 7 days at 24°C. When the relative humidity remained constant, death of the oocysts was hastened by increase of temperature, and at a constant temperature decrease in the relative humidity also hastened the death of the oocysts. Of considerable practical interest is the fact that sporulated oocysts became non-viable after one day of exposure in an electric incubator at a temperature of 39°C., and at a relative humidity of 47%. When fertile eggs were contaminated with sporulated and unsporulated oocysts they hatched normally, and no evidence of infection could be found in the chickens.—C. HORTON SMITH.

DAS-GUPTA, M. (1938). **Observations on a Coccidium, *Eimeria columbae* n.sp. from the Intestine of the Indian Pigeon, *Columba intermedia*.**—*Arch. Protistenk.* 91. 106-109. [6 refs.] [In English].

A coccidian belonging to the genus *Eimeria* was discovered on examination of the intestinal contents of pigeons in Bengal, being located in the small intestine and caeca. It differed from the previously described species, *E. labbeana*, in the presence of oocyst residue and ellipsoidal sporocysts without caps. The oocysts measured  $16.4\mu \times 14.35\mu$  in diameter, and required a sporulation time of 4-5 days.

—C. HORTON SMITH.

- I. BOUGHTON, D. C., BOUGHTON, Ruth B., & VOLK, J. (1938). **Avian Hosts of the Genus *Isospora* (Coccididae).**—*Ohio J. Sci.* 38. 149-163. [Num. refs.]
- II. BOUGHTON, D. C., & VOLK, J. J. (1938). **Avian Hosts of *Eimerian* Coccidia.**—*Bird-Banding*. 9. 140-153. 1 fig. [Numerous refs.]

I. Species of *Isospora* are recorded from 176 species and sub-species belonging to nine orders of birds, ranging from the Falconiformes to the Passeriformes. Of these records over half are from newly-recorded avian hosts. It was found that the genus *Eimeria* was usually associated with the "lower" orders [for example, the Galliformes] while the genus *Isospora* was found to be present in "higher" orders of birds like the Passeriformes.

II. Species of *Eimeria* were recovered from 37 species of birds from eight orders. The classified list of coccidia is of value in that it tabulates descriptive notes of the species and their distribution as well as referring readers to the relevant literature. Species from ducks, geese, swans, game-birds, and domestic fowls are included.—C. HORTON SMITH.

HEGNER, R., & WOLFSON, F. (1938). **Association of *Plasmodium* and *Toxoplasma*-Like Parasites in Birds.**—*Amer. J. Hyg.* 28. 437-454. 11 figs., 1 table. [Numerous refs.]

Observations and experiments were made in order to ascertain whether the

bodies which occur in the endothelial cells of birds infected with malarial parasites are schizonts of a *Plasmodium* or the sign of an infection with a second parasitic species resembling a toxoplasma. Endothelial invasion was found associated with *Pl. relictum*, *Pl. nucleophilum*, *Pl. cathemerium*, and *Pl. elongatum*, but was not present in infection with certain strains of *Pl. relictum* and *Pl. cathemerium* or in infections with other species of *Plasmodium*. Attempts to separate this toxoplasma-like infection from the plasmodium infection by subinoculation, transmission through *Culex pipiens*, treatment with quinine, centrifugation, or treatment of material by methods designed to destroy plasmodia but not toxoplasms, were all unsuccessful. This failure to separate the infections is not considered conclusive evidence that the endothelial forms are not due to a second parasite, as it is considered that knowledge of the epidemiology of toxoplasms is defective.

As a rule, canaries recover from malaria, but all the birds in which toxoplasma-like bodies were detected died. It may be that the development of an exoerythrocyte schizogony cycle is associated with the tendency to produce serious illness.—U. F. RICHARDSON.

CARDONA, L. (1936). "*Babesia bovis*" e corpi anaplasmoidi in un focolaio di piroplasmosi nelle Marche. [*Bovine Piroplasmosis and Anaplasmoid Bodies in Cattle in Sanseverino, Italy*].—*Arch. ital. Sci. med. colon.* 17. 614-620. 2 figs. [17 refs.]

C. describes infection in two bovines kept in stalls where others of the same herd had died with similar symptoms, which appeared after slight and not very exhausting work.

At P.M. examination the blood was light red and watery and there were haemorrhagic infiltrations in the subcutaneous connective tissue. The liver and spleen were enlarged and congested, and the kidneys were blackened and easily decapsulated.

Ticks collected in the stalls were found to be *Dermacentor spp.* Material from the spleen, liver and kidneys, stained with Giemsa and May-Grünwald-Giemsa, contained *Babesia bovis*. Anaplasmoid bodies observed were considered to be developmental forms of the babesia.

SAUNIE, M. (1988). Contribution à l'étude de la nuttalliose en France. [*Nuttallia Infection in France*].—*Bull. Acad. vét. Fr.* 11. 274-276. [4 refs.]

Two cases of nuttallia infection are described in adult horses which were being used for hyperimmunization work with anaerobes.—F. H. MANLEY.

—. (1988). *Studies in Anaplasmosis*.—*Rep. Kans. agric. Exp. Sta.* No. 1. pp. 32. 2 tables. [Numerous refs.]

This report embraces a large variety of experiments which have been carried out on anaplasmosis of cattle in Kansas since 1928. Out of 12 experimentally infected cattle which received no treatment, two died; recovered animals proved resistant to infection. Calves inoculated with infected blood acquired a resistance and became carriers. Experiments with flies (tabanids) as possible vectors were negative. Sheep were able to transmit the infection six months after they had been inoculated. The infectivity of the blood was destroyed by 0.1-0.5% formalin, and the treated blood showed no immunizing value. Laked blood, refrigerated for 14 days, lost its infectivity and failed to immunize. Mercurochrome was of value in effecting a prompt recovery in acute attacks, but various other drugs which were tested were without effect. A number of other experiments are also described.—S. J. GILBERT.

CONTI, G. (1936). Anaplasmosi nei bovini della Colonia Eritrea. [**Bovine Anaplasmosis in Eritrea**].—*Arch. ital. Sci. med. colon.* 17. 302-303.

C. reports the discovery of *Anaplasma marginale*, either alone or with *Babesia bigemina*, *B. bovis* or *Theileria mutans*, in the blood of cattle infected with rinderpest. C. considers that cattle become immune to *A.m.* following an infection during calf-hood, and that the reappearance of the parasites is due to the weakening of the immunity as the result of infection with rinderpest. Actual disease due to the organism is rare.

FÜSTHY, O. (1938). Untersuchungen über das Vorkommen der Balantidiosis in Ungarn. [**Balantidiosis in Hungary**].—*Zbl. Bakt. I. (Orig.)*. 142. 133-137. 2 tables. [7 refs.]

F. discusses the importance of balantidiosis in Hungary, and states that whilst three cases of human infection have been recorded there, no investigation into porcine infection has been undertaken. He examined 100 swine by suspending 50 g. of faeces in gauze in normal saline in a funnel fitted with a long rubber tube and stopcock; after 4-6 hours' incubation the balantidia migrated through the gauze to the stopcock and could be detected by microscopic examination of fluid from that point. He was thus able to demonstrate that 91% of the swine were affected with either *Balantidium coli* or *Bal. suis*. Examination of 160 human beings revealed infection in a woman employed in tripe cleaning, but she exhibited no disease symptoms. F. was able to demonstrate experimentally that normal stomach juices or weak hydrochloric acid have an adverse effect on the vitality of *Bal. coli* and probably prevent infection, and to show that the infected woman exhibited gastric hypo-acidity, a condition which has been recorded in other cases of human balantidiosis. —U. F. RICHARDSON.

LEVINE, N. D., DUNLAP, G. L., & GRAHAM, R. (1938). **An Intracellular Parasite Encountered in Ferret**.—*Cornell Vet.* 28. 249-251. 1 fig. [1 ref.]

A small intracellular parasite resembling a *Cryptococcus* and an *Encephalitozoon* was found in the lungs, liver and spleen of a ferret which had been used for hunting rats and rabbits. It is suggested that the animal may have become parasitized by an *Encephalitozoon* as a result of eating rabbits' heads, as *E. cuniculi* is found in the brain of rabbits. Alternatively, it is suggested that the intracellular parasite seen in the organs examined was a new species of *Cryptococcus* confined to the ferret, or an already described species of this organism in an unusual host. No experimental animals were inoculated.—L. E. HUGHES.

BARRAIRON, E. (1938). Contribution à l'étude étiologique de l'anasarque du boeuf. [**Aetiology of Bovine Anasarca**].—*Thesis, Toulouse*. pp. 70. 9 figs. [Numerous refs.]

This is an account of a condition occurring in enzootic form in herds in southern France. The condition is characterized by high temperature and oedema of the limbs in the early stages, later followed by scleroderma. B. discusses the various theories as to aetiology, and arrives at the conclusion that the cause is a sporozoan belonging to the genus *Globidium*, described by BESNOIT and ROBIN (1912). The life-history of the organism is still unknown, but possibly insects play a role as vectors. The disease can be reproduced by the inoculation of blood from affected animals in the febrile stage. An account of measures recommended for prevention and treatment is given.—N. J. SCORGIE.

## DISEASES CAUSED BY VIRUSES

LOMBARDI, L. (1936). Sull'importanza dei germi di complicazione nell'afra epizootica. [**The Importance of Secondary Bacteria in Foot and Mouth Disease**].—*Nuova Vet.* 14. 190-195. 1 table.

During an outbreak of F. & M. disease in Bologna province in 1984-1985, L. made cultural examinations of the liver, spleen, kidneys, heart, lungs, mesenteric lymph nodes, brain, and one long bone, of affected animals. The cultures were made in agar and serum agar, and the bacteria were identified on selective media such as Gassner's medium, Drigalski-Conradi medium and media containing glucose, lactose and mannite. The following bacteria, in order of frequency, were identified :- *Bact. coli*, staphylococci, streptococci, diplococci, and in one case each, *Salmonella paratyphi* and *Pseudomonas pyocyanea*.

*Bact. coli* was found in each of the organs named, staphylococci mainly in the myocardium and kidneys, and the streptococci in the liver, lungs and mesenteric lymph nodes. In the more marked lesions in the liver and kidneys there were usually mixed infections. [The carcasses were taken to the institute for this purpose; no details are given concerning the interval between death and the preparation of the culture].

- I. MANSEAU, A. (1988). Considérations sur les moyens de lutte à opposer à la fièvre aphteuse. [**Control of Foot and Mouth Disease in France**].—*Rec. Méd. vét.* 114. 660-670.
- II. RINJARD, P. (1988). Prophylaxie spécifique et moyens de lutte contre la fièvre aphteuse. [**Specific Prophylaxis and Other Methods of Controlling F. & M. Disease**].—*Ann. Méd. vét.* 83. 198-225, and 268-270. [Num. refs.]
- III. ROSSIGNOL, L. (1988). Vaccination anti-aphteuse par le procédé Lignières. [**Lignières' Method of Vaccination against F. & M. Disease**].—*Bull. Soc. vét. prat. Fr.* 22. 164-167.
- IV. REY, C. (1988). La prophylaxie de la fièvre aphteuse. [**Prophylaxis of F. & M. Disease**].—*Thesis, Lyons.* pp. 66. [18 refs.]
- V. AGHSSA, M. (1988). Des méthodes de l'immunisation anti-aphteuse. [**Methods of Immunization against F. & M. Disease**].—*Thesis, Alfort.* pp. 91. [Numerous refs.]

I. During the recent epizootic of F. & M. disease in France, the author obtained very favourable results by the injection of cattle exposed to infection with large doses of blood from recovered animals, followed 24 hours later by an inoculation with virulent lymph.

II. In this article the author reviews the various methods of controlling F. & M. disease under the following headings :- nature, duration and fluctuations of immunity, plurality of virus, passive and active immunization, serum-vaccination, and haemo-vaccination.

III. An official trial of the method of vaccinating cattle against F. & M. disease described by LIGNIÈRES [*V. B.* 4. 512.] failed to demonstrate conclusively that it was completely efficacious. This result is in keeping with the opinion widely held in France that there is no certain method of vaccination which will rapidly immunize animals against the disease without a risk of creating new foci of infection. The author points out that important details regarding the method of preparation of the attenuated virus used for vaccination were not divulged by J. LIGNIÈRES. Similarly, R. LIGNIÈRES, who has reduced the number of injections from three to two, has failed to give precise details of the technique which has enabled him to dispense with one of the injections.

IV. The author describes the use of immune serum from recovered animals during a recent epizootic of F. & M. disease in France. Satisfactory results were obtained in arresting the disease in animals exposed to infection, provided sufficiently large doses were given.

V. A brief summary of the present position, with no original observations.  
—R. E. GLOVER.

- I. PIENING, C. (1938). Maul- und Klauenseuche und Enteritiserkrankungen beim Rinde. [**Foot and Mouth Disease and Enteritis in Cattle**].—*Berl. Münch. tierärztl. Wschr.* Nov. 11th. 688. 1 table.
- II. WITTE, J. (1938). Gehäufte Breslau-Infektionen bei Rindern im Anschluss an Maul- und Klauenseuche. [**The Incidence of Salmonella Infection in Cattle in Association with F. & M. Disease**].—*Z. Fleisch- u. Milchhyg.* 49. 103-104.

I. On the examination of 4,059 bovine carcasses for paratyphoid infection during 1938, P. detected infection in 3.8% of adult cattle slaughtered on account of F. & M. disease, against a rate of 2.54% in uninfected adults. In calves, the paratyphoid infection in carcasses of animals slaughtered for F. & M. disease was 8.54%, against a rate of 5.46% in other calf carcasses. It was noticeable that in the case of adult carcasses infected with F. & M. disease, 55% of the detected salmonella infections were confined to the gall-bladder or lymph nodes.

II. W. records the detection of infection with *S. enteritidis* in three cows, all from one farm, which had been slaughtered for F. & M. disease. In one case this infection occurred in the muscles of the fore and hind quarters, whilst in the others it was only detected in the lymph nodes, spleen, kidneys and liver. In all three cases the bone-marrow was infected. It is discussed whether all three animals were carriers of the organism during life, or whether the infection might have been derived from one animal, the other carcasses being contaminated in the abattoir. Examination of the farm concerned failed to reveal any *S.e.* infection. It is suggested that this incident illustrates the importance of bacteriological examination of all cases of emergency slaughter, and that all precautions should be taken in an abattoir to prevent contamination of other carcasses from those of carriers of infection.  
—U. F. RICHARDSON.

- I. FORSELL, G. (1939). Om mul- och klövsjukans smittämne. [**The Virus of Foot and Mouth Disease**].—*Manadsbl. skand. Kreaturoförsäkringsbol.* 17. 1-2.
- II. MAGNUSSON, H. (1939). Mulsjukeserum av stor betydelse för att lindra sjukdomen. Oeverveterinär Pålsson har konstruerat en billig och praktisk serumspruta. [**An Injection Pump for Administration of Serum for Immunizing against F. & M. Disease**].—*Ibid.* 2-3. 3 figs.
- III. ANON. (1939). Mul- och klövsjukans verkliga läge alltjämt kritiskt. Farso- tens läge i statistisk belysning. [**The F. & M. Disease Situation in Europe**].—*Ibid.* 4-10. 5 charts, 3 maps.
- IV. ANON. (1939). Intressanta uttalanden av lantbrukare, vilkas besättningar drabbats av mul- och klövsjuka. Risken för följsjukdomar minskas genom omsorgsfull djurvård. [**Losses from F. & M. Disease Reduced by Care on the Part of the Farmer**].—*Ibid.* 11-12.
- V. EDIN, H. (1939). Mjölksom fodermedel åt vuxna nötkreatur, speciellt inom besättningar, som isolerats på grund av mul- och klövsjuka. [**Milk**

as Food For Adult Cattle, Especially in Herds Isolated during an Outbreak of F. & M. Disease].—*Ibid.* 13-15. 1 table.

I. A popular survey is given of the properties of the virus, resistance to infection, and different methods for the control of the disease.

II. The value of convalescent serum is referred to and a description is given of a special type of injection pump.

III. Graphs show how the epizootic spread from France to Sweden, where in December, 1938, 900 herds became infected in one week. During this period the stamping out method was given up in the two southern counties of Sweden.

IV. Emphasis is laid on the importance of good hygienic conditions when animals are allowed to recover from F. & M. disease.

V. When herds are maintained in isolation during F. & M. disease outbreaks, it is generally necessary to use the milk as food for the adult cattle. After a week cows generally become accustomed to drinking the milk, and it may then be given with other concentrated foods.—H. C. BENDIXEN (COPENHAGEN).

— (1938). Zwalczenie pryszczycy w swiecie ustawodawstwa. [**Regulations for the Control of F. & M. Disease in Poland**].—*Przegl. wet.* 53. 273-279.

According to the laws of August 22nd, 1927, on infectious animal diseases, and of January 9th and April 1st, 1928, animals affected with F. & M. disease are to be slaughtered when such measure will enable the outbreak to be checked, and the cost is borne by the government.

Control measures against possible infection are detailed. A zone with a radius of 15 km. is declared infected. When an outbreak occurs in a neighbouring country at any point less than 20 km. from the frontier, a belt 40 km. wide within the Polish frontier is placed under restrictions. When the infection is spread over a large area vaccination is advised. Details are given of the action taken to deal with outbreaks.

Cats, dogs, poultry and pigeons which cannot be isolated must be killed. There must be no traffic with the infected district until three weeks after the disease has died out.

Details are given concerning disposal of manure and methods of disinfection.

WICKTOR, C. E., & COALE, B. B. (1938). **Vesicular Exanthema**.—*Vet. Med.* 33. 516-518.

The authors describe the virus disease of pigs in California which is clinically indistinguishable from foot and mouth disease [*V.B.* 7. 114]. It occurs in garbage-fed animals. During a short course characterized by fever and anorexia, multiple vesication occurs on the snout, lips, oral and nasal mucosa, coronary region and udder. Ulceration, sloughing, and shedding of the hoofs may result. Less acute outbreaks occur, but in all cases the mortality is low. The disease can be transferred experimentally to horses, in which it assumes a very mild form.

For differential diagnosis experimental inoculation of test animals must be relied upon—the susceptibility of horses to vesicular exanthema and vesicular stomatitis, but not to F. & M. disease, and the susceptibility of cattle and g. pigs to vesicular stomatitis and F. & M. disease, and not to vesicular exanthema.

—D. D. OGILVIE.

GIRARD, H. (1938). Essai de vaccination contre la péripleurite à l'aide de la sérosité pleurale incorporée dans la lanoline. [**Vaccination against Contagious Bovine Pleuro-Pneumonia with Pleural Exudate in Lanoline**].—*C. R. Soc. Biol. Paris.* 129. 590-593. [7 refs.]

The addition of lanoline to toxins and vaccines in order to obtain greater

antibody response has been described by various workers. G. gives an account of experiments to ascertain if any ill effects follow the injection of the virus of contagious bovine pleuro-pneumonia in lanoline and whether such injection immunizes. The vaccine was prepared by mixing 5 g. of lanoline with 2 c.c. of virus obtained from the pleural cavity of animals killed during an attack of the disease; 15-18 c.c. of ground nut oil were added to facilitate injection. Subcutaneous inoculation in the neck or behind the shoulder was followed by some local reaction, which tended to subside after 7-8 days. There was considerable evidence of the production of immunity, but more tests must be made before definite conclusions to be made as to the value of the method and the duration of immunity.—S. J. GILBERT.

JEZIC, J. (1988). La peste porcine est-elle transmissible aux moutons ? [**Possible Transmission of Swine Fever to Sheep**].—*Rec. Méd. vét.* **114**. 714-717.

A brief review is given of some attempts that have been made to transmit S.F. to other animals by artificial methods, and some positive results are reported. The author does not report on his own work. Sheep and goats are reported also to have contracted natural infection. Virus mixed with that of sheep pox and passed through sheep, produced S.F. when inoculated into pigs. Some multiplication of the S.F. virus is said to have taken place.—F. H. MANLEY.

HUPBAUER, A., & SKOKOVIC, L. (1988). Prilog epizootologiji svinjske kuge. Da li ovce igraju kod širenja svinjske kuge izvjesnu ulogu ? [**Epizootology of Swine Fever. Possible Role of Sheep in the Spread of the Disease**].—*Vet. Arhiv.* **8**. 453-459. [9 refs.] [French summary].

The authors examined JACOTOT's statement [*V. B.* **8**. 288.] that sheep may be susceptible to S.F. virus and that they may spread it to pigs.

They found that S.F. virus will persist in the blood of sheep, following either subcutaneous or intratesticular inoculation, for at least 16 days, but not for 30 days. No evidence of the multiplication of the virus in the sheep could be ascertained. Pigs kept with such infected sheep remained healthy. It was found that 1 c.c. of the virus from the sheep would infect pigs even after a dilution of 1:6,000,000.

—B. OSWALD (KRIŽEVCI).

VONČINA, D. (1988). Prilog serodijagnostici svinjske kuge. [**On the Sero-Diagnosis of Swine Fever**].—*Jugoslav. vet. Glasn.* **18**. 143-148. 4 tables. [6 refs.] [German summary].

The value of Cuverkalov and Kucerenko's [Zuwerkalow and Kutscherenko's] method for the sero-diagnosis of S.F. by means of the urine [*V. B.* **5**. 574.] was examined in 96 healthy and infected pigs. The results here reported failed to support the claims of these authors.—B. OSWALD (KRIŽEVCI).

- I. BUMÜLLER, E. (1987). Untersuchungen über eine Vereinfachung des diagnostischen Kaninchenversuches bei der ansteckenden Blutarmut des Pferdes. [**A Simplification of the Rabbit Test in the Diagnosis of Equine Infectious Anaemia**].—*Inaug. Diss., Hanover*. pp. 48. 24 tables. [Numerous refs.]
- II. MÖNKEMEIER, A. (1987). Weitere vergleichende Untersuchungen über die Vereinfachung des Kaninchenversuches für die Diagnose der ansteckenden Blutarmut des Pferdes. [**Simplification of the Rabbit Test in the Diagnosis of E.I.A.**].—*Inaug. Diss., Hanover*. pp. 34. 10 tables, 10 charts. [Num. refs.]
- III. PETERS, T. (1987). Weitere Beiträge zur Diagnose der ansteckenden Blutarmut der Pferde mit Hilfe des Kaninchenversuches. [**The Rabbit**

**Test in the Diagnosis of E.I.A.]—Inaug. Diss., Hanover.** pp. 51. 24 figs., 24 tables. [Numerous refs.]

- IV. PRESSER, H. (1937). Der Wert des Kaninchenimpfversuches für die Epidemiologie der ansteckenden Blutarmut der Pferde. [**The Value of the Rabbit Inoculation Test in the Epidemiology of E.I.A.]—Inaug. Diss., Hanover.** pp. 107. 82 tables, 82 graphs. [Numerous refs.]

I. B. introduced E.I.A. virus into rabbits subcutaneously or into the rectum, and in each case injected 3 c.c. of a 1% alcoholic solution of phenylhydrazine (subcut.) three days later; phenylhydrazine causes a chronic anaemia. After six days he demonstrated in the liver appreciable amounts of iron, which, according to some authors, is absent from the normal rabbit liver. It is suggested that unless further experiments show that iron is also deposited in the liver of rabbits inoculated with healthy horse serum, this procedure may serve as a test for the diagnosis of E.I.A.

II. M. describes similar experiments in which it is stated that rabbits were successfully infected with E.I.A. when inoculated (subcut.) with 1 c.c. of serum from diseased horses, even without subsequent injection of phenylhydrazine [see I, above]. He confirmed the occurrence of iron deposits in the liver of the rabbits so treated, but the amounts he found, except in one case, were extremely small. This was considered to be due to the fact that the rabbits were killed for examination too long (10-16 days) after the phenylhydrazine injection.

III. The serum of horses with no definite clinical symptoms of E.I.A., but whose blood reacted positively to the mercuric chloride test, caused the same changes in the blood picture of rabbits, injected *per rectum*, as did serum from horses known to be affected with the disease. P. concludes, therefore, that horses reacting positively to the mercuric chloride blood test should be suspected as carriers of E.I.A. In further experiments the blood picture of rabbits was affected by the subcutaneous injection of 1 c.c. or more of porcine serum; the effect produced was therefore not of a specific nature. [The author apparently considers that the rabbit can be infected with the virus of E.I.A.]

IV. P. states that he was able to demonstrate by inoculating rabbits (subcut. or *per rectum*) with the serum of 17 horses from a farm in the Saarbrücken district, that all were infected with E.I.A. The clinical history of the horses and three blood tests of each made during the two preceding years had provided no definite evidence as to whether they were infected or not.

BALOZET, L. (1938). Études expérimentales sur l'anémie infectieuse des équidés (V). Action du ricinoléate de soude, de l'enrobage et de l'inoculation de faibles doses. [**Equine Infectious Anaemia. (V). Effect of Sodium Ricinoleate on the Virus, Effect of Suspension in Fat and Effect of Inoculation of Weak Doses.]—Arch. Inst. Pasteur Tunis.** 27. 189-192. [4 refs.] [See also *V. B.* 8. 153.]

Virulent serum from an affected donkey was mixed with sodium ricinoleate (1:250 and 1:500); the mixture was kept for 15 minutes and was then inoculated into donkeys. The animals did not contract the disease, and they did not acquire immunity. Two donkeys were inoculated with three doses of 0.3 c.c. each of virulent serum at three-day intervals. Two other donkeys were given subcutaneously 4 c.c. of virulent serum incorporated in an oily excipient. In both experiments similar results were obtained; a mild form of the infection developed in one animal and a very severe attack was manifested in the other. No attenuation of the virus was observed.—E. C. HULSE.

STAMATIN, N. (1938). L'action du sérum immun sur le virus de la clavelée. [**Action of Immune Serum on Sheep Pox Virus**].—*C. R. Soc. Biol. Paris*. 127. 635-637. [1 ref.]

Sheep pox virus was treated with varying amounts of immune serum in the presence of charcoal. After centrifugation, the sediments, tested on sheep, were still virulent. It is suggested that the charcoal selects the virulent elements from inert serum-virus mixtures.—R. E. GLOVER.

GRIMPRET, J. (1938). La variole de la chèvre au Maroc. [**An Outbreak of Goat Pox in Morocco**].—*Rec. Méd. vét. exot.* 11. 105-112. [2 refs.]

G. first encountered goat pox in Morocco in 1932. An epizootic recurred in 1938 in the same region and he gives a detailed description of the disease. An experiment on vaccination with pox scabs of 15 goats gave indefinite results, as neither these animals nor unvaccinated controls could be infected, possibly owing to the low virulence of the virus at the end of the epizootic.—S. J. GILBERT.

ØRSKOV, J., & ANDERSEN, Else K. (1938). Weitere Untersuchungen über die Bildungsstätten der virusneutralisierenden Stoffe bei Vaccineinfektion von Kaninchen. [**The Production Site of Neutralizing Antibodies in Rabbit Pox**].—*Acta path. microbiol. scand.* Suppl. No. 37. 621-631. 6 tables. [In German].

The authors claim to have proved that when rabbits are infected by intratesticular injections with rabbit pox virus, antibodies are present earlier and to a higher titre at the local site of infection than when the infection is by the dermal route.—E. J. PULLINGER.

REIS, J., & NOBREGA, P. (1937). Sobre um virus tripathogenico de bouba de canario. [**A Pox Virus from Canaries**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo*. 8. 211-214. 3 figs. on 2 plates. [10 refs.] [English summary].

A strain of fowl pox virus pathogenic for chicks, pigeons and passerine birds (small singing and perching birds) is described; it was isolated from *Serinus canarius* and *Sicalis flaveola*, which were seriously affected, the mortality being 98%. The strain of virus immunized against a known fowl pox virus and a known pigeon pox virus.—S. TORRES.

HELLESNES, P. (1938). Hvalpesyke hos sølvreven. [**Distemper in Silver Foxes**].—*Norsk VetTidsskr.* 50. 625-632. 1 fig. [1 ref.]

The article is a preliminary report of investigations on distemper of the silver fox, carried out by H. during recent years at the State Veterinary Clinic, Oslo, and is published to provide veterinary practitioners with information concerning the clinical picture of this disease new to Norway. The first outbreaks occurred in 1936, and since then the infection has somewhat increased. A royal decree issued in 1938 made the notification of the disease compulsory.

H. describes the symptoms in foxes, which are similar to those observed in dogs, i.e., of a catarrhal as well as a nervous nature; this is also the case when the distemper is associated with salmonella infection, a complication frequently observed. Differential diagnosis and means of spread are also discussed. In adult foxes the mortality may reach 20%, but is usually much lower. In young cubs, however, the mortality may reach nearly 100%, especially when salmonella infection is also present.

Dog distemper vaccine and dog distemper antiserum produced in England proved ineffective in protecting foxes against distemper, but "Behringwerke" dog distemper antiserum was of considerable prophylactic value.

The type of fox distemper here described was found to be not quite identical with the type reported from Sweden by CARLSTRÖM and SVENSSON [*V. B.* 8. 704.]  
—GUSTAV NAERLAND (OSLO).

- (1938). Conférence internationale de la rage tenu à Bucarest du 6 au 11 mai 1938. [**International Conference on Rabies held at Bucarest (May, 1938)**].  
—*Bull. Off. internat. Epiz.* 17. 59-61.

A conference of the representatives of eight countries at Bucarest recommended various measures designed to ensure collaboration between different Institutes and countries, and to further intensive study of the virus and other conditions concerning rabies.—S. J. GILBERT.

- GERLACH, F. (1938). Virusstudien bei Tollwut. [**Studies of the Virus of Rabies**].  
—*Z. InfektKr. Haustiere.* 53. 279-290. 7 figs. [10 refs.]

A study of the histological changes which follow both natural and artificial infections with street, passage, and fixed rabies virus. The study was largely concentrated upon small granular bodies, which were thought to be virus particles, found in the central nervous system, meningeal fluid, salivary glands and serosa. Similar bodies were seen in preparations made from virus egg-cultures.—E. J. P.

- REMLINGER, P., & BAILLY, J. (1938). Le rapport chloré érythroplasmatique dans la rage expérimentale du chien et du lapin. [**The Ratio of Chlorine between Plasma and Erythrocytes in Experimental Rabies in Dogs and Rabbits**].—*Maroc. méd.* 18. 414-415. 2 tables.

Experiments were carried out on 30 dogs and 10 rabbits, the observations being made prior to inoculation and at the end of paralysis. The variation in the ratio showed an increase in all cases, the increase in the corpuscular chlorine content being greater than that in the plasma.—F. H. MANLEY.

- I. FRANCIS, T., Jr. (1938). **The Immunology of Epidemic Influenza**.—*Amer. J. Hyg.* 28. 63-79. [Numerous refs.]
- II. FRANCIS, T., Jr., & STUART-HARRIS, C. H. (1938). **Studies on the Nasal Histology of Epidemic Influenza Virus Infection in the Ferret. I. The Development and Repair of the Nasal Lesion**.—*J. exp. Med.* 68. 789-802. 26 figs. on 4 plates. [Numerous refs.]
- III. STUART-HARRIS, C. H., & FRANCIS, T., Jr. (1938). **Studies on the Nasal Histology of Epidemic Influenza Virus Infection in the Ferret. II. The Resistance of Regenerating Respiratory Epithelium to Reinfection and to Physicochemical Injury**.—*Ibid.* 803-812. 12 figs. on 2 plates, 1 table. [12 refs.]
- IV. FRANCIS, T., Jr., & STUART-HARRIS, C. H. (1938). **Studies on the Nasal Histology of Epidemic Influenza Virus Infection in the Ferret. III. Histological and Serological Observations on Ferrets Receiving Repeated Inoculations of Epidemic Influenza Virus**.—*Ibid.* 813-830. 6 figs. on 1 plate, 4 tables, 1 chart. [5 refs.]
- V. FRANCIS, T., Jr. (1939). **Quantitative Relationships between the Immunizing Dose of Epidemic Influenza Virus and the Resultant Immunity**.—*Ibid.* 69. 283-300. 4 tables, 1 chart. [12 refs.]

I. The author summarizes current views regarding epidemic human influenza. He points out that the problem of immunity is complicated by several factors. In some instances, simultaneous outbreaks of clinical influenza in many parts of the world appear to be due to viruses transmissible to the ferret and showing close

antigenic affinities. In other instances, strains which from the immunological standpoint are quite dissimilar, may be obtained from localized outbreaks. In addition, he suggests that the supposed lack of immunity and the recurrence of epidemics of influenza may not be due to an absence of resistance to the virus, but to the existence of an influenza syndrome in which a virus pathogenic for the ferret cannot be obtained.

Clinical and experimental data show clearly that a state of resistance may exist in a population over a period of several years. This immunity is apparently not entirely dependent upon demonstrable antibodies, but may be due to changes in the cells of the respiratory tract.

II. Following intranasal instillation of influenza virus in the ferret, there is almost complete destruction of the respiratory epithelium between the 24th and 48th hours. Reparative changes commence about the sixth day, firstly in the form of the development of a differentiated stratified squamous epithelium, and later by the presence of a stratified columnar ciliated epithelium.

III. During the period immediately following necrosis of the nasal epithelium the mucosa is completely refractory, not only to further instillations of influenza virus but also to severe physico-chemical injury induced by a 1% solution of zinc sulphate accompanied by a weak galvanic current. This resistance is attributed to the presence of the transitional squamous epithelium, since as soon as normal cells develop (21 days), susceptibility to injury by both agents is restored.

IV. Ferrets were exposed to repeated intranasal instillations of virus at varying intervals, but no evidence was obtained that any permanently modified epithelium with enhanced resistance was produced. Further experiments suggested that there was a parallelism between the titre of neutralizing antibodies and resistance to infection as determined by histological study, *i.e.*, that circulating antibodies tended to protect the cellular structures.

V. Preliminary experiments in mice showed that amounts of influenza virus in dilutions varying from  $10^{-3}$  to  $10^{-4}$  given intraperitoneally afforded nearly complete immunity, whereas with smaller doses the protection was of a lower order. A striking relationship was observed between the dose of virus used for vaccine and the amount of test virus required to produce severe lesions.

In ferrets, the titre of the circulating antibodies depended upon the quantity of virus contained in the vaccinal dose, the minimum amounts required being about 100 intranasal infecting units. Partially immune ferrets with low circulating antibodies often responded to an intranasal infection. The antibodies then rose to a much higher level than after a primary infection.—R. E. GLOVER.

ZINSSER, H., WEI, H., & FITZPATRICK, F. (1938). Nouvelles méthodes du culture de *Rickettsiae* du typhus à propos de la production de vaccins. [**New Methods of Cultivating Rickettsia for the Production of Typhus Vaccines**]. —*C. R. Soc. Biol. Paris*. 127. 229-232. 1 fig. [7 refs.]

Formolized cultures of the *Rickettsia* of murine typhus have given satisfactory results as vaccines in practice, but there has been a difficulty in producing large quantities by Nigg and Landsteiner's method of culture [*V. B.* 3. 83.], as the rickettsia will only multiply in cells and yet if large quantities of cells are added to the medium no growth of rickettsia occurs. This failure of multiplication was found to be due to the production of acid by the metabolic activity of the cells.

A method is now described in which a medium of 4% agar dissolved in equal quantities of horse serum and Tyrode solution is placed in a test tube and covered with cells. The reaction of the medium is adjusted to pH 7.6-7.8. The tube is closed by a cork pierced by a capillary glass tube through which fluids can be

introduced to correct the production of acid. The rickettsia commence to multiply rapidly on the fifth day, and by the tenth day a quantity is obtainable ten times greater than that from a Maitland flask.—U. F. RICHARDSON.

CLAUDE, A. (1936). L'action de la trypsine cristallisée sur l'agent d'un sarcome aviaire transmissible. [**Action of Crystallized Trypsin on the Agent of a Transmissible Avian Sarcoma**].—*Ile Congr. internat. Cancer, 1936*. pp. 88-92. 1 table. [12 refs.]

C. describes the action of two proteolytic enzymes, isolated from the pancreas, on the active principle of sarcoma-extract in fowls. The crystallized trypsin inactivated the growth of the tumour. The crystallized carboxypolypeptidase, under the same conditions, had no action. In relation to the proteolytic action of the trypsin, the sarcoma agent behaved like a protein.

### PARASITES IN RELATION TO DISEASE [GENERAL]

HÜLPHERS, G., & LAGERLÖF, N. (1938). De viktigaste parasitsjukdomarna hos får och deras bekämpande. [**Control of Important Parasitic Diseases of Sheep**].—*Svensk VetTidskr.* 43. 211-242. 17 figs. [3 refs.]

The paper is a survey of the most frequently occurring intestinal, hepatic, pulmonary and dermal parasites in sheep, giving short descriptions of the most characteristic clinical and pathological disturbances they cause. The authors give an account of the existing methods of control by prophylactic and curative treatment.—GUSTAV NAERLAND (OSLO).

— (1937). **Report of Committee of Parasitic Diseases [U.S. Live Stock Sanit. Inst.]**.—*J. Amer. vet. med. Ass.* 90. 346-352.

Notable progress was made in the control of parasites of swine, sheep and cattle during 1936. The application of hygienic measures resulted in greatly reduced infestations of swine with various parasites and also in the production of better types of hogs. In the control of liver fluke, spraying the ground with copper sulphate is only a temporary expedient, but drainage of the land is most effective and also improves the quality of the pasture as well as acting as a mosquito control measure. Screw-worm (*Cochliomyia americana*) infestation is of particular danger on account of the rapidity with which one affected animal can spread the parasite to others. Animals should be treated before shipment to prevent the introduction of the parasite into uninfested districts.

Worm infestation of chickens was a serious problem. Roundworms can be controlled by hygienic measures, but tapeworms are more difficult to deal with, on account of the nature of the intermediate hosts concerned. Several strains of fowl were produced which had a marked resistance to infection with *Ascaridia lineata*.—HUGH N. SPEARS.

### PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SIMMONS, S. W. (1937). **Some Histopathological Changes Caused by Hypoderma Larvae in the Esophagus of Cattle**.—*J. Parasit.* 23. 376-381. 6 figs., 2 tables. [6 refs.]

Histological studies were made of the oesophagus of cattle infested with larvae of *H. lineatum*, the material being obtained from an abattoir. The larvae normally

occurred in the submucosa and caused an inflammatory oedema, which distorted the submucous connective tissue and occasionally invaded the muscularis mucosae. A constant feature was the presence of enormous numbers of leucocytes in the affected area. Eosinophiles predominated, but lymphocytes and plasmocytes were also numerous. The average density found was 476,865 eosinophiles per c.mm. Many of the eosinophiles were myelocytes, especially in heavy infestations. In the channels left by the larvae, dead leucocytes and fibrin were present, and in most cases the channels were surrounded with fibroblasts. It is suggested that the function of the eosinophiles is the neutralization of toxins produced by *Hypoderma* larvae.—R. P. HOBSON.

CARLIER, F. (1938). Lutte contre le varron des bovidés. Effets de différentes substances médicamenteuses sur la larve d'hypoderma bovis. [Control of Ox Warbles. Effect of Various Drugs on the Larva of *H.b.*].—*Thesis, Alfort*. pp. 51. [Numerous refs.]

From preliminary trials with larvae of *Gastrophilus intestinalis*, an extract of timbo (*Lonchocarpus nicou*) in carbon tetrachloride was chosen as a suitable insecticide for treating cattle infested with warbles. Pure carbon tetrachloride proved rapidly fatal to *Gastrophilus* larvae, and its toxicity was increased by the material extracted from timbo, which includes rotenone. A suitable emulsifier was added to the extract so that it could be diluted with water before use. Field experiments were carried out by sponging the backs of affected cattle with this preparation. One treatment was sufficient to kill the larvae; the swellings disappeared within 3-4 days, and the lesions quickly healed. It is suggested that, after the treatment, the parasites are digested and absorbed by the tissues.—R. P. HOBSON.

ROBINSON, L. E. (1935). **Parasites of Sheep. Bulletin No. 1. The Sheep Maggot Fly.** pp. 31. 10 figs., 2 photographs, 1 appendix. London: The Cooper Technical Bureau.

The problem of the sheep maggot fly and its control in Great Britain is discussed from the viewpoint of the scientist, the flockmaster, and the shepherd.

The life-history of *Lucilia sericata* is traced, and a description is given of the infestation of the sheep. The conditions inducing attacks upon sheep include soiling of the fleece with dung, blood, or serous liquids, decomposition of skin secretions following prolonged rainy weather, dipping in badly fouled baths, and previous infestation with fly maggots. Control of the condition is difficult. Sheep grazing on open pastures are least liable to be attacked. Repellent dressings are said to be of very limited value, while hand-dressing of infested sheep is of great benefit. Dipping in arsenic-sulphur dips has both preventive and curative effect. In a bad season such dipping may have to be repeated every month. Crutching obviates soiling of the breech, but jetting, which consists in spraying the crutch and rump with arsenical dip at high pressure, is more popular. The trapping and poisoning of maggot flies are only of value if applied extensively.

The incidence of maggot fly has shown a great increase in recent years, apparently because of the mild winters and warm summers, and because of changed agricultural conditions such as the spread of bracken, the increase of deer and the more extensive keeping of ewes on low-ground arable farms.

In the appendix a number of fly-traps are described, and instructions are given for their use.—D. D. OGILVIE.

MACLEOD, J. (1938). **The Tick Problem.**—*Vet. Rec.* 50. 1245-1250. 3 figs. [8 refs.]

The problem of severe tick infestation of sheep in Great Britain is an old

established one, but recent researches have tended to focus new attention upon it. Lately the spread of ticks to new territory has occasioned some alarm, but in practice this is essentially an unimportant phase of the problem.

Various factors are set out as controlling tick survival. Of these only humidity is of moment in Great Britain. A very high moisture value is required for survival, ordinary atmospheric conditions being rapidly lethal. Such humidity occurs only in vegetation which remains deep and matted over the summer. Rough hill grazings and poorly managed pastures thus constitute the areas of spread. The obvious remedies are mixed grazing, severe harrowing, liming, burning and cutting, and sheep dipping.

Although it is probably true that a host such as the hare may sustain the tick population, the author considers it unwise to condemn all wild animals equally in this respect. Full consideration of the habits and environment of the deer, for example, will show that this animal is of little consequence in the problem, and the wholesale slaughter of herds of these animals is, therefore, unjustifiable.

—D. D. OGLE.

YUTUC, L. M. (1988). **Notes on a Hitherto Unreported Acarine Parasite of Carabao in the Philippines.**—*Philipp. J. anim. Indust.* 5. 363-366. 8 figs. on 3 plates, 1 table. [6 refs.]

Owing to their predilection for mud and water, water-buffaloes are not commonly attacked by mites. The *Acarus* described, a psoropt, was recovered from a domesticated water-buffalo. A description, with diagrams, is given of the common psoropt of cattle, and from a comparative table of measurements there would appear to be little, if any, difference between this and the psoropt now described.

Attempts to transmit the mite to two horses, two water-buffaloes and one calf were unsuccessful. The symptoms and lesions caused by the mite are those of ordinary psoroptic mange.—F. J. ANDREWS.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

SKRJABIN, K. I., & ŠULČ, R. E. S. (1937). *Gelmintozja krupnogo rogatogo skota i ego molodnjaka. [Helminth Parasites of Cattle]*. pp. 723. 167 figs., 8 tables. [Numerous refs.] Moscow: State Publication Department for Collective and State Farms. [4to].

This is a work on systematic and practical helminthology of cattle in Russia, containing a fair number of figures and a number of selected bibliographies throughout the text.

The first part of the book (pp. 1-640) contains an elaborate systematic description of the various helminths of cattle and the diseases for which they are responsible. In each case the biology, distribution, pathogenesis and method of control are given; the more important worms such as *Fasciola*, *Cysticercus*, *Echinococcus*, *Dictyocaulus*, *Thelazia* and *Neoscaris* are dealt with, at greater length.

In the second part (pp. 648-714) the authors deal with the "diagnosis, therapy, epizootology and prophylaxis of helminthiasis in cattle".—J. E.

SRIVASTAVA, H. D. (1988). **The Occurrence of *Paragonimus westermani* in the Lungs of Cats in India.**—*Indian J. vet. Sci.* 8. 255-257. [10 refs.]

S. recovered two specimens of *P.w.* from the lungs of a cat in India.—R. FISHER.

SRIVASTAVA, H. D. (1938). **A New Trematode—*Prosthogonimus indicus*, N. SP.—Occurring in the Oviduct of Indian Fowls, with Remarks on 'Prosthogonimiasis'.**—*Indian J. vet. Sci.* 8. 213-220. 3 figs. on 2 plates. [Numerous refs.]

During the examination of a number of dead fowls, S. isolated from the oviducts of two a species which he has named *Prosthogonimus indicus*. Prosthogonimiasis occurs in a large number of different species of birds, and affects only females. Egg production decreases and soft-shelled eggs are laid. The parasite usually lives in the bursa fabricii, and may occasionally be found inside apparently normal eggs. The pathological changes are mainly confined to the ovaries and oviducts, but peritonitis, emaciation and anaemia also occur. Diagnosis during life is difficult. The parasites may be removed from the intestines by the cautious use of carbon tetrachloride, but no treatment will remove them from the oviduct.

—R. FISHER.

EMSBO, P. (1938). *Taenia saginata*. [**A Study of T.s.**].—*Skand. VetTidskr.* 28. 289-312. 4 figs., 2 tables. [English summary].

The paper, which was read as a lecture on a self-selected theme at the competition for the professorship of bacteriology, meat and milk inspection (including veterinary parasitology) at the Royal Danish Veterinary College, is a treatise on the present state of knowledge concerning *T.s.*, its anatomic structure and development cycle, including the cyst form *Cysticercus bovis*. E. stresses the hygienic importance of the parasite from the human point of view, and its importance from the point of view of veterinary meat inspection.

Statistical figures from meat inspection records show that *C.b.* has occurred with increasing frequency in Danish cattle during recent years. Its incidence increased from 0.89% of the total number of ox carcasses examined in 1933 to 0.58% in 1936, *i.e.*, an increase of nearly 50%. Possible causes of this increase are discussed, and it is concluded that the present methods of controlling the parasite are ineffective and that there should be closer collaboration between the veterinary officials concerned and the medical practitioners.—G. NAERLAND (OSLO).

MUDALIAR, S. V., & IYER, K. S. G. (1938). *Pseudanoplocephala crawfordi* Baylis 1927.—*Indian J. vet. Sci.* 8. 235-237. 2 text figs., 1 fig. on 1 plate. [4 refs.]

The authors record what they believe to be the first finding of adult cestodes in pigs in India. The specimens described are said to resemble in almost all details *Ps.c.* The species found would appear to be a common intestinal parasite of pigs in South India.—R. FISHER.

CHATON, M. (1938). Recherches pour servir à l'étiologie et au diagnostic de l'échinococcose alvéolaire multiloculaire du foie chez l'homme. [**Origin and Diagnosis of Multilocular Echinococcosis of the Liver in Man**].—*Rev. Path. comp.* 38. 479-493. 1 fig. [3 refs.]

This article deals with the answers to a questionnaire concerning the incidence of multilocular echinococcosis in food animals, sent by C. to 66 veterinarians in the province of Franche-Comté and the adjoining territory of Belfort. Replies were received from 58 veterinarians; 22 of these reported a varying incidence, the majority of cases being noted in small village centres, especially in the mountainous regions of the area, rather than in the large town abattoirs.

The cysts are common in pigs, and pig flesh is eaten in an almost raw state as smoked ham; they were also noted in sheep, rabbits and in one horse.

C. speaks of an as yet untested extract of affected pig liver prepared as a diagnostic agent.—C. V. WATKINS.

MORRISON, A. E. (1988). **Prevention of Hydatids. Act Operates on 1st January.**—*N. Z. J. Agric.* **57**. 409.

The Dogs Registration Act, 1987, is intended to reduce the high incidence of hydatid disease in the Dominion. The act came into force on January 1st, 1989, when local authorities were required to supply dog-owners with arecoline hydrobromide, the prescribed remedy for treating dogs.—L. W. N. FITCH.

BACIGALUPO, G., & FRANZANI, O. F. (1986). A proposito del potere antigenico dei liquidi idatidei. [**The Antigenic Power of Hydatid Fluid**].—*G. Batt. Immun.* **16**. 872-876. [English, French and German summaries].

The authors experimented on rabbits, inoculating them with hydatid fluid taken from the sheep, ox and pig, and using the complement-fixation test to demonstrate antibodies. They conclude that hydatid fluid is still antigenic after heating for five minutes at 100°C.

BAUMGARTNER, A. (1937). Erfahrungen über Magendarmstrongylose bei den Wiederkäuern. [**Gastro-Intestinal Strongylosis in Ruminants**].—*Schweiz. Arch. Tierheilk.* **79**. 801-817. 2 figs.

After a general discussion of the literature B. describes strongylosis in the cow, goat, sheep and mountain goat. He considers that arecolin or "contortin" (areca nut and kamala preparations respectively) are good remedies, but recognizes the difficulty in effecting cures.—P. S. WATTS.

TAYLOR, E. L. (1988). **Observations on the Bionomics of Strongyloid Larvae in Pastures. I.—The Duration of Infection in Pasture Herbage.**—*Vet. Rec.* **50**. 1265-1272. 9 figs., 2 tables. [8 refs.]

The rate of disappearance of strongyloid larvae from pastures was studied under field conditions. Grass was grown from seed in boxes of sterile soil kept out of doors but screened from interference by birds and protected from slugs and snails. When the grass was 2-3 in. high the soil was sown with infective larvae. The latter were recovered by cutting the grass, shaking it in water, and examining the sediment.

It was found that the larvae ascended the grass rapidly and suffered great losses during the first few weeks. Some died during the first 24 hours. The longest lived larvae were those which remained on the leaf sheaths and did not climb on to the exposed leaves, but only a small number of larvae survived until near the estimated maximum period. In comparison with redworm (tricho-strongyle) larvae, the larvae of *Strongylus vulgaris* appear to have a relatively long life.

These observations justify the important suggestion that resting a pasture even for a few weeks may effect considerable reduction in the numbers of its strongyle population.—D. D. OGILVIE.

REFUERZO, P. G., & GARCIA, E. Y. (1988). **The Crustacean Intermediate Hosts of Gnathostoma Spinigerum in the Philippines and its Pre- and Intra-Crustacean Development.**—*Philipp. J. anim. indust.* **5**. 851-862. 5 plates, 1 table.

Ova from a gastric tumour and from the faeces of a dog naturally infected with *Gn.sp.* were cultured in Petri dishes of water at 29°-31°C. Daily examination revealed that the eggs, which are from the first-celled to the multicellular stage, become embryonated in two days. On the fourth day the larvae begin to hatch out, and are immediately infective to the crustacean host. The larvae show a

definite affinity for cyclops, but a water-flea (probably *Moiria macrocapa*) appears to be immune. In the body cavity of the former, growth and development occur, culminating in a stage which is infective to the piscine host. The longevity of the crustacean varies directly with the intensity of the infection. The larvae, however, may live for long periods after the death of this host.

In feeding experiments with fish the authors succeeded in producing encysted larvae in one specimen of *Clarias batrachus* and one of *Anabus testudinis*. However, the remote possibility that these fish were previously infected cannot be ignored.—D. D. OGILVIE.

DOUGLAS, J. R. (1938). **A Survey of Canine Thelaziasis in California.**—*J. Amer. vet. med. Ass.* **93**. 382-384. 1 fig., 3 tables. [7 refs.]

A questionnaire sent to 197 veterinarians in California resulted in information concerning 39 cases of canine thelaziasis. In every case it was reported that the dog either lived in or paid frequent visits to wild areas. The life-history of the causative parasite remains obscure, but the observation that most cases of the disease appear in winter and spring may be of moment in elucidating the problem.

*Th. californiensis* inhabits the lachrymal duct or conjunctival sac, and causes conjunctivitis, excessive lachrymation, scarification of the cornea, and occasionally blindness. The number of worms in the cases reported varied from one to 100, with an average of about 17.

The parasites are widely distributed in California, but *Th.c.* has not yet been reported elsewhere.—D. D. OGILVIE.

IYER, P. R. K. (1938). **A Form of Verminous Ophthalmia in Equines.**—*Indian J. vet. Sci.* **8**. 3-11. 8 figs. on 2 plates, 1 table. [9 refs.]

An equine periodic ophthalmia in the Punjab, occurring at all seasons, has been attributed to mechanical irritation by dust or flies, to bacteria, or to dietetic deficiency. I. claims to have eliminated these agents as primary factors and to have found that the condition is due to the presence of microfilariae in the cornea and lachrymal glands. Changes observed in the conjunctiva and cornea of affected equines were associated with acute inflammation and the presence of a variable number of microfilariae on histological examination. Similar changes were also observed in the lachrymal glands, and microfilariae were found in sections examined. Concentration of equines in the presence of large numbers of flies appears to be associated with the spread of the disease.

The microfilariae were unsheathed, and are thought to be those of an onchocercoid worm, the adult of which has not yet been found. Antimosan treatment appears to inhibit the disease.—J. A. GRIFFITHS.

## IMMUNITY

COLOSINI, P. (1936). Anti-“esotubercolina” d'origine naturale nel cavallo e nel bue. [**An “Anti-Exotuberculin” Substance Found in Healthy Horses and Cattle.**—*Profilassi.* **9**. 52-55. [6 refs.] [French and German summaries].

Serum from healthy horses, and, in one case, serum from a calf born of a tuberculous cow, was mixed with exotuberculin and injected subcutaneously into cattle reacting positively to exotuberculin alone. In most cases no rise in temperature followed. C. therefore concludes that serum contained a substance capable of preventing the usual temperature reaction to exotuberculin. The proportion of serum to exotuberculin in these experiments was usually about 80:1.

MINSTER, R. D. (1937). **The Advantage of Stained Antigens in the Diagnostic Agglutination Test for Brucella Infections.**—*J. Lab. clin. Med.* 23. 298-300. [3 refs.]

The addition of 1:40,000 gentian violet and 1:18,000 brilliant green to brucella antigen is recommended for the elimination of pseudo-reactions due to bacterial contamination of blood samples and agglutination tubes. Contaminated sera gave clear-cut results with this stained antigen and not with unstained antigen.

—R. O. MUIR.

CONDREA, P., POENARU, Hélène, & DIMA, G. (1937). Sur la présence des anticorps antitétaniques dans le sérum des chevaux normaux. [**Anti-Tetanic Antibodies in the Serum of Normal Horses**].—*C. R. Soc. Biol. Paris.* 125. 768-770. [1 ref.]

The sera of 121 normal stallions, mares and geldings of various breeds two months to 23 years old were examined for the presence of tetanus antitoxin, but none was found.

The authors next examined the sera of 40 horses varying in age from 30 days to 23 years for the presence of somatic and flagellar agglutinins to the tetanus bacillus. In foals 80-50 days old, no agglutinins were present. All the other sera had flagellar agglutinins at titres varying from 1:5 to 1:200, except for three samples from young horses. From two years upwards there was no difference in titre due to age. Somatic agglutinins were never found. The absence of flagellar agglutinins from foals and their presence in older animals shows that it is a case of natural acquired immunity, which the authors explain by the intermittent passage of the flagellar antigen through the wall of the alimentary tract.

The absence of antitoxic immunity means that the bacilli do not find in the alimentary tract the conditions favourable to the production of the specific toxin, or that the toxin is modified in the alimentary tract.

PHILIPSON, J. (1937). **Experimental Studies on Enhanced Resistance to Infection Following some Non-Specific Measures.**—*Acta path. microbiol. scand.* Suppl. No. 82. pp. 148. 1 fig., 45 tables, 1 chart. [Numerous refs.] [In English].

This monograph is principally concerned with "promunity" [see next abstract] to Shiga infection as a result of vaccination with paratyphoid B vaccine, and with other questions which arose during the progress of the investigations. It was found that mice immunized with the vaccine and revaccinated two weeks later showed an increased resistance to Shiga infection when tested two hours after revaccination. This resistance is more marked in revaccinated immunized animals than in immunized animals not revaccinated. It was not accompanied by the presence of Shiga agglutinins in the mouse serum, nor was it possible to transfer this resistance passively to normal mice.

A similar enhanced resistance in mice to Shiga infection also arose from injections of rabbit, horse and mouse serum, and this was more marked on injection into previously serum-treated animals than in the case of normal animals.

—GWILYM O. DAVIES.

ØRSKOV, J., & KAUFFMANN, F. (1936). Untersuchungen über die Typhusimmunität der Maus. [**Immunity to Typhus in the Mouse**].—*Z. Hyg. InfektKr.* 119. 65-71. 6 tables. [10 refs.]

In research on typhoid fever immunity, the authors found that mice infected with W forms of bacilli (O-agglutinable without Vi antigen) developed a transient

immunity against V forms (O-agglutinable with Vi antigen) within a very few days. This phenomenon was quite distinct from the slowly forming and long-lasting immunity following infection with the V forms. They suggest the term "promunity". "Promunity" is less specific than the ordinary immunity and cannot be transferred passively.—J. E.

BABIĆ, I. (1938). Griješke u umijeću prigodom žaštitnog i ljekovitog cijepljenja domaćih životinja. [**Errors in Preventive and Curative Vaccination of Domestic Animals**].—*Jugoslov. vet. Glasn.* **18**. 425-430. [9 refs.] [German summary].

Accidents after both preventive and curative vaccination of domestic animals are discussed from the forensic standpoint. Questions arising from the responsibility of the maker, the attendant veterinarian, and the owner respectively are discussed.—B. OSWALD (KRIZEVCI).

REESER, H. E. (1938). Bepaling van bloedgroepen in paardebloed. [**Blood Groups in Horses**].—*Tijdschr. Diergeneesk.* **65**. 115-126. 2 graphs. [English, French and German summaries].

Blood groups were studied in horses by examining 2,500 combinations of sera and blood cells. In 19.4% of the cases, iso-agglutination was observed. The O group was not demonstrated, but the AB group of man was. To prevent confusion it was proposed to call this group in the horse XY. Chemicals must not be added to the sera and blood cells used for such tests, as they influence the result of the reactions. The latter should be observed microscopically.

—JAC. JANSSEN (UTRECHT).

ABELL, R. G., & SCHENCK, H. P. (1938). **Microscopic Observations on the Behavior of Living Blood Vessels of the Rabbit during the Reaction of Anaphylaxis**.—*J. Immunol.* **34**. 195-218. 4 figs. [Numerous refs.]

In an attempt to investigate the theory that death in anaphylaxis is due to contraction of the pulmonary arterioles followed by dilatation of the right ventricle, the authors observed the reactions of the blood vessels in the living rabbit's ear, using the transparent moat chamber technique evolved by Abell and Clark [(1932). *Anat. Rec.* **53**. 121].

Intravenous injection or direct introduction of horse serum into the moat in the case of a sensitized rabbit, was followed by contraction to the extent of occlusion of the arterioles, but no contraction of the venules or capillaries occurred. Increased adherence of leucocytes to the vascular endothelium, leucocytic emigration from the venules or capillaries, and clumping of leucocytes causing embolism of the venules and capillaries were also observed, but were not of such regular occurrence. Repeated doses caused extravasation of erythrocytes and actual endothelial destruction. No specific precipitate was visible at any time.—H. V. HUGHES.

## DISEASES, GENERAL

MENZIES, D. W. (1938). **Diseases of Sheep in the South-West**.—*Vet. Rec.* **50**. 971-976. [5 refs.]

A consideration of the common bacterial infections of sheep met with in Wiltshire and Dorset. The lesions of lamb dysentery in these counties differ from those of the condition as it occurs in the east of England in that blackish perforated ulcers do not develop in the intestine. Enterotoxaemia occurs in lambs and ewes,

causing a loss of 1-2%. "Swayback" has been observed in lambs and older sheep. Severe outbreaks of omphalophlebitis have been found to be due to a haemolytic streptococcus. Losses from pregnancy toxæmia in some "grass flocks" have amounted to 15%. Contagious pustular dermatitis is also mentioned.—N. J. S.

CATHERINE, A. (1988). L'élevage dans l'extrême-Sud de Madagascar. [**Animal Husbandry in the South of Madagascar**].—*Thesis, Alfort*. pp. 101. 8 figs., 1 map. [Numerous refs.]

C. gives an account of animal husbandry in the extreme south of Madagascar. All classes of livestock are reared, but a limiting factor to improved conditions is the absence of an adequate water supply. In addition to actual losses during periods of drought there is also a resulting lack of resistance to bacterial and other infections. Intensive stocking of the pastures with cattle facilitates the spread of tuberculosis. From the years 1927 to 1986, T.B. of the lungs was found in 14.8-19.4% of the carcasses inspected at one of the abattoirs. Losses amongst cattle from anthrax are approximately 3% per annum; the disease is rarely met with in sheep and pigs. Ringworm occurs in cattle. It is stated that ticks are of less importance in the spread of disease than in other tropical countries. Certain birds play a useful part in keeping the ticks in check. Various forms of mange occur in cattle. At the experimental farm gastro-intestinal strongylosis causes great losses in sheep and goats; it is stated that sulphur is used as a remedy. Cysticercosis in cattle is rare, but during three years' inspection 4.5-8.8% of pigs were found to be affected.—N. J. SCORGIE.

VALCARENCHI, E. (1986). Nevropatie, paralisi di Marek e coccidiosi aviare. [**Fowl Paralysis and Coccidiosis**].—*Profilassi*. 9. 97-105. 7 figs. [Numerous refs.] [French and German summaries].

V. describes an outbreak of paralysis on a large Italian poultry farm, where 15% of the fowls, mainly between the ages of 3-5 months, were affected and usually died. He concludes from macroscopic and microscopic examination, and transmission experiments, that it was due to an intense infection with coccidia. Good results are claimed for treatment with thymol, illustrations being given of affected birds before and after cure.

BUTZ, H. (1988). Neuere Ergebnisse der Erbfehlerforschung in der Tierzucht. [**Recent Advances in the Study of Hereditary Defects in Animals**].—*Berl. Münch. tierärztl. Wschr.* November 18th. 703-706.

This is a short review of some of the recent literature dealing with hereditary defects in domestic animals. Among the dominant lethal factors discussed are achondroplasia in Dexter calves, homozygous grey fleece colour in Rumanian sheep, and inability to fly among poultry. Such dominant lethal genes are usually readily detected. Recessive lethal genes are of more importance since they are more common and the heterozygous individuals cannot be distinguished from normal animals. An important example is atresia coli in foals. Other examples are epitheliogenesis imperfecta neonatorum and hypotrichosis cystica in calves. The former condition has also been recorded in the foal. A further recessive lethal factor is responsible for atresia ani in pigs, and this may be accompanied by a lethal factor for "thick leg" in which there is an enormous increase in the connective tissues of the legs.

Other conditions considered hereditary are flat hoof, roaring, cataract, cryptorchidism and inguinal and umbilical hernia in the horse. In the pig, polydactylism syndactylism and cryptorchidism are inherited conditions. It is stressed that

although an isolated example may not be of great interest or importance, cases should be recorded, since the accumulation of evidence may be of value in tracing the conditions observed to a particular locality or to individual parent animals.

—E. G. WHITE.

BÜRGI, O. (1938). Chronische Atembeschwerden und Lungengeschwülste des Pferdes. [**Chronic Respiratory Disorders and Lung Tumours in the Horse**].—*Festschrift Theodor Schmidt*. pp. 25-82. 3 figs. [Numerous refs.] Berlin and Vienna: Urban & Schwarzenberg.

B. stresses the importance of a primary bronchitis in the production of chronic vesicular emphysema, and discusses some unpublished work which explains the localization of the emphysematous changes in the horse on the basis of a sparsity of elastic fibres in the pleura over these areas.

Chronic respiratory distress in the horse may also be due to neoplasia of the lungs, and a case of primary adenocarcinoma and one of secondary sarcoma are described. The former is of special interest since both lungs were affected with multiple neoplasms, the epithelium lining their acini being similar to bronchial epithelium.—E. G. WHITE.

M'FADYEAN, J. (1938). **Equine Contagious Pneumonia. German Brustseuche.**—*J. comp. Path.* **51**. 108-118. 1 text fig., 6 figs. on 3 plates. [5 refs.]

This paper is largely a review of the German work carried out on "Brustseuche", commencing with that of SCHÜTZ, published in 1887, and culminating in that of GAFFKY and LÜHRS (1918) who showed the primary cause of the disease to be a filtrable virus. In addition, three cases are described illustrating the pneumonic changes of "Brustseuche" which are due to streptococci. The autopsies were carried out on animals which died at the Royal Veterinary College, London, in 1903, 1906 and 1916. The lesions consisted of a broncho-pneumonia with a marked tendency to necrosis and gangrene and a secondary pleurisy with effusion.—E. G. WHITE.

MARSH, H. (1938). **Pneumonia in Rocky Mountain Bighorn Sheep.**—*J. Mammal.* **19**. 214-219.

A description is given of the incidence, symptoms and pathology of two distinct diseases which have caused considerable loss from time to time during the last 18 years among herds of Rocky Mountain Bighorn sheep.

The more prevalent disease was a subacute or chronic broncho-pneumonia of adult sheep, apparently caused by a lungworm, *Protostrongylus stilesi*, with secondary bacterial invasion by *Corynebact. pyogenes* and a species of *Pasteurella*. The heavy infestation by parasites is considered to be due to the lack of proper winter ranges, with consequent overgrazing and overcrowding of autumn and spring ranges.

The second disease described is an acute bacterial pneumonia of lambs 2-3 months old. Bacterial and histological work was carried out in only two cases, and in these a *Pasteurella* appeared responsible for the condition, with *Corynebact. pyogenes* as a secondary invader.—F. J. ANDREWS.

I. NUNGESTER, W. J., & JOURDONAIS, L. F. (1936). **Mucin as an Aid in the Experimental Production of Lobar Pneumonia.**—*J. infect. Dis.* **59**. 258-265. 1 table. [19 refs.]

II. ROBERTSON, O. H. (1938). **Recent Studies on Experimental Lobar Pneu-**

**monia. Pathogenesis, Recovery and Immunity.**—*J. Amer. med. Ass.* 111. 1432-1437. 3 figs. [Numerous refs.]

- III. ROBERTSON, O. H., & FOX, J. P. (1939). **The Relationship of Infecting Dosage, Leucocytic Response, Bacteremia, and Extent of Pulmonary Involvement to the Outcome of Experimental Lobar Pneumonia in the Dog.**—*J. exp. Med.* 69. 229-246. 9 tables. [8 refs.]

I. The objects of these experiments, like those of certain other workers, was to throw some further light on the aetiology of lobar pneumonia in human beings, in particular on the reason why normal individuals may harbour virulent pneumococci in the upper respiratory tract and not contract pneumonia, and to explain the mechanism by which such predisposing factors as exposure to cold, dust or fatigue lower the resistance of the host.

The authors' work was concerned with attempts to set up lobar pneumonia in white rats, taken from a source known to be free from spontaneous pneumonia, by the intrabronchial injection of small doses of pneumococci (Type III). A small brass canula was passed into the trachea, soap solution then being smeared over the proximal end in order that the formation of soap bubbles might indicate that the canula was actually in the trachea. A small ureteral catheter was then passed through the canula until resistance was met, withdrawn 3-4 mm., and the injection made. Some 200 experimental animals were used as well as a number of controls.

It was found that the suspension of the injecting dose in small amounts of sterile mucin (viscosity adjusted to 5, equivalent to a 5-8% solution) aided greatly in the production of lobar pneumonia in the rat. As few as 100 bacteria when inoculated in 0.1 c.c. mucin produced what is described as lobar pneumonia in 50% of inoculated animals. By increasing the dose 10-100 times, the incidence of pneumonia was increased to 84% (86 animals). When similar doses were injected in saline, the incidence of pneumonia was markedly lower. Consolidation varied in extent, but with doses of 0.1 c.c. of  $10^{-5}$  usually involved nearly all of the injected lobe. The different stages of the pneumonia produced in the rat are regarded as similar to those in human beings and a histological report is to follow. In rats the temperature quickly became sub-normal after an initial rise. Mucin alone in 0.1 c.c. dose caused little disturbance, but larger inocula of this or of saline were found to be contra-indicated.

The authors support the view that the mucin acts by protecting the bacteria and that this may in part explain the action of cold, dust, etc., in the development of lobar pneumonia in the human subject, since an outpouring of mucin is a result of such agencies.

II. In this article the previous observations of the author and his co-workers on experimental pneumonia in the dog are summarized and discussed, together with the findings of others in work of a similar nature. Most of the outstanding results have already been abstracted [*V. B.* 9. 258.] with the exception of those relating to immunity which may be briefly summarized here.

The mechanism of recovery appears to be a dual one: firstly, a generalized process consisting of (1) the pneumococcus-killing power of the blood and (2) what is called the lung-blood barrier, which even in the absence of (1) may be sufficient to prevent bacteraemia; and, secondly, the macrophage activity. If either fails, death ensues.

One attack of experimental pneumonia confers an increased resistance for many months; this resistance seems to lie in accelerated macrophage activity which occurs when injection is again attempted. Against very large doses it was, however, only effective for a short period, correlated with the demonstrable presence

of macrophages, and confined to the previously affected area. Repeated injections were followed by a greater degree of resistance.

III. The authors describe further experiments on some hundreds of dogs in which they have studied the influence of various factors on the course and outcome of the intrabronchial injection with Type I pneumococci suspended in starch broth by the method described in 1933 [V. B. 9. 258].

Injecting doses of 0.001 c.c. or less of culture produced few lesions and no deaths, and doses of 0.01 to 0.03 c.c. a mortality of 8%, but with larger amounts of culture the average extent of the lesions increased to half of the total lung field (X-ray pictures; confirmed by autopsy when death occurred) and the mortality to over 60%. Increase of the volume of the starch suspension itself from the usual 1 c.c. to 6 c.c. also produced double the pulmonary involvement and increased the mortality eight times, a result attributed to the larger number of alveoli initially involved. At 24 hours after injection, the white cell count proved the best index of the probable outcome, the mortality increasing with diminishing numbers of circulating white cells then present. Animals with less than 2,000 per c.mm. usually died and those with 20,000 per c.mm. nearly always recovered. The extent of pulmonary involvement also bore a direct relation to the death rate. When the lesion was confined to one lobe the death rate was about 1%. Involvement of other lobes was accompanied by a sharply rising mortality which reached 98% in dogs with three-fourths of the total lung field involved. Increasing occurrence of bacteraemia also in general ran parallel with decreasing white cell counts and increasing lung involvement. After the 24 hour stage it was the best index of the final outcome. Provided bacteraemia did not occur, the animal often recovered, although leucopenia was marked and pulmonary involvement was extensive, but, when bacteria occurred together with a count of 5,000 or less, or involvement of one half or more of the total lung field, death nearly always resulted. The relationship of these findings to those in human lobar pneumonia are briefly discussed.

- A. W. STABLEFORTH.

DATTA, S. C. A. (1938). **Chronic Bovine Haematuria.**—*Rep. 1st. Imp. vet. Conf. Lond. 1938.* pp. 78-79. Discussion pp. 79-81. Weybridge: Imperial Bureau of Animal Health. [5s.]

D. described his investigations in India and showed photomicrographs of an aspergillus, which was invariably found in intimate association with the disease, and which had been demonstrated in jugular blood and kidney and bladder tissue from natural cases. Strains of the fungus from different localities were alike in their morphological and staining characters, cultural requirements and biological behaviour, and were highly pathogenic to rabbits and other animals, affecting primarily the urinary system. Transmission experiments were carried out on healthy bulls by the prolonged administration of morbid material, and various degrees of bladder infection were set up in three adults, varying from the development of well established patchy congestion or rounded oedematous nodular growths to papillomata with minute ulcers. Haematuria was produced in a calf in three months by oral administration of urinary sediment from clinical cases, and the fungus was recovered in pure culture from this and the other cases. It differed from any of the described species, but seemed to belong to the *Aspergillus glaucus* group and fulfilled the criteria of pathogenic aspergilli. In an adult bull which died within a month of receiving a massive dose of the aspergillus intravenously in pure culture, characteristic lesions were produced in the viscera. Histological examination showed characteristic aspergillar heads projecting into the lumen of the blood vessels, with the consequent bursting of the vessel wall,

but in a much more pronounced form than in naturally infected animals. In D's opinion, the constancy of the results described was an indication that the disease was due to the organism described.

Dr WATSON described the conditions in Canada, where the infection is found only in British Columbia, principally in the delta of the Frazer River [see *V. B.* 8. 41.], occurring year after year on some farms, while on others it tended to die out as the land was brought under close and continuous cultivation. Some farms near those affected were never affected. On one farm the young bulls became affected in early life, but over a long period of years the cows were not affected. When affected cows were removed from the district and put on unaffected farms they seldom recovered, but no fresh cases developed. In 25 years of study in Canada, thousands of specimens of blood, urinary sediments, bladder lesions and kidney sections had been examined for bacteria, protozoa and parasites. The aspergillus described by D. had not been observed.

Dr HOPKIRK said that the disease occurred in New Zealand, but disappeared as soon as the bush was cleared.

Mr DAUBNEY said that in Kenya there were two main areas of infection, in both of which tea was grown. On one farm, nearly all cows a few years ago were liable to contract the disease, mostly at parturition, but with the improvement of the stock and paddocks and the clearing of the bush and bracken the disease had died out, and there had been no cases for seven years. He suggested that the fungus described might be parasitic on some plants found only on poor pasture. He also pointed out that in the later stages of the disease the urethra was patent and that the organism described might thus gain an entrance.

Other speakers mentioned the danger of confusing haematuria and haemoglobinuria, and the possibility that the disease might be transmitted at service.

POMMERET, M. (1937). *Entamoeba kamala* et l'hématurie essentielle des bovidés. [*E.k. as the Cause of Bovine Haematuria*].—*Thesis, Alfort*. pp. 63. 13 figs. [Numerous refs.]

This thesis consists chiefly of a general description of chronic bovine haematuria with particular attention to the work of DATTA [*V. B.* 6. 66]. P. examined the urine and bladder of French cows affected with haematuria, but failed to observe amoebae in microscopic preparations or to isolate amoebae in culture. [DATTA has since described a species of *Aspergillus* in lesions, and has suggested that this is the cause—see previous abstract].—J. E.

GUENTHER, D. F. (1937). Beitrag zum Studium der verschiedenen Formen der Hämoglobinurie. [*The Various Forms of Haemoglobinuria*].—*Tierärztl. Rdsch.* 43. 586-588. [11 refs.]

A general article without fresh protocols, dealing with haemoglobinuria associated with haemolysins, methaemoglobinuria of toxic origin, haemoglobinaemia paralytica, and haemoglobinuria in piroplasmoses and other diseases.—H. H. G.

BRION, A. (1937). Sur la pathogénie de la myoglobinurie. [*Pathogenesis of Myoglobinuria*].—*Rev. Méd. vét., Toulouse*. 89. 505-525. 2 tables. [Numerous refs.]

A general review of present knowledge on the pathogenesis of equine myoglobinuria, in which the histology and biochemistry of affected muscles are described in relation to function and to clinical symptoms of the disorder. A section on the functioning of healthy muscle is followed by one on muscle metabolism in myoglobinuria. The parts played by reserve glycogen and by lactic acid [*V. B.* 1.

234.], by the phosphorus compounds of muscle and by blood glucose are discussed, and an explanation is offered for the disturbed oxidative processes. Arrested glycolysis in this disorder is compared with that of muscle experimentally poisoned with iodo-acetic acid. Insulin supply appears to play no part. The physical state of muscle fibres following colloidal imbibition by muscle proteins on alteration of pH under conditions of disturbed muscular metabolism explains the clinical symptoms.—H. H. GREEN.

PALMER, C. C. (1938). **Pyelonephritis in Cattle**.—*J. Amer. vet. med. Ass.* **93**. 241-243. 1 table. [7 refs.]

P. observed the course of pyelonephritis in three herds. The spread of the disease was very slow, and its course in an affected animal lasted months, clinical symptoms not becoming obvious until the lesions were pronounced. One case is described in detail, a Gram-positive diphtheroid and *Eberthella pyogenes* [Bergey] being isolated.—S. F. BARNETT.

GUILLOU, J. (1938). Sur un état hémorragipare des jeunes bovins du Finistère. [**A Purpuric Disease of Young Cattle in Finistère**].—*Thesis, Alfort*. pp. 56. [18 refs.]

G. describes a purpuric disease attacking cattle 3-18 months old, which appears to be peculiar to Brittany. The disease occurs in enzootic form only during the warm months of the year, and is almost always fatal. It is characterized by high fever, snoring, and nasal, anal, and subcutaneous haemorrhage, the latter being the pathognomonic symptom. The P.M. lesions resemble those of haemorrhagic septicaemia, but in no case did cultures reveal the presence of *Pasteurella bovisseptica*. It is stated that experiments excluded the possibility that bracken poisoning is a cause. Control is said to consist of the separation of healthy and affected animals, the former being kept out of the stable night and day, and the maintenance of the affected ones indoors, so that they can be properly cared for. It is advocated that a prophylactic inoculation of 150-200 c.c. of citrated blood from adult animals should be given.—N. J. SCORGIE.

TUNIS, E. (1936). Contributo clinico-terapeutico sulla encefalomyelite infettiva dei bovini. [**Infectious Encephalomyelitis in Cattle**].—*Profilassi*. **9**. 190-191. [French summary].

T. describes three cases of what is described as enzootic encephalomyelitis in Sardinia.

CARPANO, M. (1938). Oftalmite contagiosa dei bovini. [**Contagious Ophthalmia in Cattle**].—*Azione vet.* **7**. 624-626.

C. describes an outbreak of contagious ophthalmia in cattle in Albania, and asserts that it is little known in Europe, though known in North America, parts of Africa and elsewhere. He insists on the contagious nature of the disease, though admitting that sun-glare, dust, and flies may be predisposing causes. He implies that it is due to a virus. He gives details of the symptoms and general course of the disease, which varies between conjunctivitis and panophthalmia, and may lead to blindness.

He insists on the necessity for isolation of infected cases, and says this should be continued for 20 days after the disappearance of the symptoms.—S. F. J. H.

CIRENEI, G. (1938). Lesioni anatomo-patologiche renali da compressione poco comuni in animali da macello. [**Unusual Renal Lesions in Slaughter Animals**].—*Clin. vet., Milano*. **61**. 494-496. 9 figs. on 2 plates.

C. reports in detail two cases of unusual renal lesions in animals brought to

an abattoir. In a pig, there was a large renal capsule cyst in the left kidney, and in a calf about two months old half of the tissue of one kidney was in the form of a multilocular, hydronephrotic sac, the size of a child's head.—S. F. J. HODGMAN.

- (1938). **Facial Eczema in Sheep and Cattle. Prevention by Farm Management.**—*N. Z. J. Agric.* 57. 538.

A Facial Eczema Management Committee, composed of officers of the Departments of Agriculture and Scientific and Industrial Research, and representatives of farmers' interests, was set up in April, 1938, to consider the recent severe outbreak of facial eczema (photosensitivity) in New Zealand and make proposals for the investigation and prevention of the disease. The committee summarizes a general plan of prevention and considers that as facial eczema is apparently caused by a quick flush of grass in warm and humid weather following a period of drought, stock should be kept off rapidly-growing grass in the autumn for several weeks. They urge that, in order to ensure that this practice may be followed, farmers should build up reserves of hay and silage and maintain a portion of their farm in mature grass, which can be grazed when a flush growth is taking place on hard grazed paddocks.—L. W. N. FITCH.

- FRASER, A. C. (1938). **Heel-Bug in the Thoroughbred Horse.**—*Vet. Rec.* 50. 1455-1457. [3 refs.] Discussion pp. 1457-1459.

The importance, nature and effects of the disease are described, and it is suggested that the harvest-bug *Trombicula autumnalis* is the cause of the condition, but no investigation was carried out. The habits and life-history are discussed. Methods of treatment, both curative and prophylactic, are described, with notes on the differentiation of the disease from the more commonly occurring lesions in the heels of horses.

A short discussion followed, during which one speaker suggested the larvae of *Strongyloides* worms might be a cause of the condition.—F. J. ANDREWS.

- I. PASSEY, R. D. (1935). **Experimental Carcinogenesis.**—*Rep. Brit. Emp. Cancer Campaign, York. Coun. 1934-1935.* pp. 8-10.
- II. CRAMER, W. (1937). **Papillomatosis in the Forestomach of the Rat and its Bearing on the Work of Fibiger.**—*Amer. J. Cancer.* 31. 537-555. 20 figs. [9 refs.]
- III. ANON. (1938). **Fibiger's Tumour of the Rat's Stomach.**—*Lancet.* 234. 735-736. [6 refs.]

I. The author reports that he was unable to produce neoplasia of the stomach in rats by infestation with *Gongylonema neoplasticum*, though he set up a heavy infestation of the oesophagus and stomach and kept his rats under observation for 500 days, a period much longer than in the case of FIBIGER's work [see also III, below]. He considers that the neoplasia in FIBIGER's rats was not aetiologically related to the worm.

II. C. carried out two series of experiments on rats, in 1927 and 1937, in order to find whether gastric papilloma could be induced in the forestomach of rats on a deficient diet, as had been claimed by FUJIMAKI [(1926). *J. Cancer Res.* 10. 469].

In 1927, large benign hyperkeratotic papillomata were produced in many rats on a diet deficient in vitamin A, and in a few rats on a vitamin B-deficient diet. The precise causal connexion between the tumour and the diet was not determined.

An attempt to induce similar gastric tumours in rats in 1937 by the same means was without success.

III. An annotation discussing the possibility that malignant neoplasms might be induced by a parasite, as claimed by FIBIGER [(1913, 1914 and 1920). *Z. Krebsforsch.* 13. 217; 14. 295, and 17. 1]. Later work has failed to support this view, as some workers have failed to induce neoplasia with *G.n.* and others have induced neoplasia by dietetic means [see I and II, above].—J. E.

WILLIAMS, J. K., GILDOW, E. M., & LAMPMAN, C. E. (1938). **Some Factors Influencing the Transmission of Fowl Paralysis.**—*U.S. Egg & Poultry Magazine*. Jan. 1938. p. 24. 1 table.

The authors state that F.P. is transmitted by contact and that up to 40% of pullets from susceptible flocks became affected when placed with affected chicks. Chicks from such flocks are stated to be less susceptible to F.P. after the first six weeks of life. Chicks from paralysis-affected stock are more resistant than those from paralysis-free stock, and those bred from pullets are more susceptible than those bred from two-year-old hens. There was found to be a marked difference in resistance to the disease in the progeny of certain matings, and the authors consider that by careful selection the incidence of fowl paralysis may be materially reduced.—J. E. WILSON.

- I. ENGELBRETH-HOLM, J., & FREDERIKSEN, O. (1938). **The Reactivation of the Fowl Leukosis Agent after Inactivation by Oxidization.**—*Acta Path. microbiol. scand.* Suppl. No. 37. pp. 138-144. 3 tables. [7 refs.] [In English].
- II. ENGELBRETH-HOLM, J., & FREDERIKSEN, O. (1938). **The Transmission of Mouse Leucaemia to Healthy Animals by Means of Cell-Free Substance.**—*Ibid.* pp. 145-154. 5 figs., 3 tables. [4 refs.] [In English].

I. In these experiments re-centrifuged leucotic chicken plasma from a mixed haemocytoblastosis-sarcoma strain was used. It was found possible to inactivate the fowl leucosis agent by oxidation. Reactivation by reduction could be demonstrated with a cystein-cobalt sulphate system provided that oxidation had not been complete. Such reactivation could restore the agent to almost full potency.

II. An attempt was made to transfer mouse leucaemia by the supernatant fluid of centrifuged lymph node material. The fluid was prepared from diseased mice killed by potassium ferricyanide, and the handling of the material was done under anaerobic conditions. After reduction with cobalt-cysteine, injections were made into mice. Thirty-six of 159 animals injected developed typical disease. Since control tests showed that the inoculum was cell-free, and the possibility of spontaneous origin was eliminated, it was concluded that lymphatic leucaemia had been transferred to healthy animals without the assistance of intact cells.—D. D. O.

SEVERGNINI, A. (1936). Un caso di leucemia linfadenoidale in un cavallo. [**Lymphadenoid Leucaemia in a Horse**].—*Proflassi*. 9. 147-149.

S. describes a case of lymphatic leucaemia in an undernourished, overworked and badly kept horse. The appearance of the blood, lymph nodes, bone-marrow, spleen, liver, intestines, lungs and heart is described.

VON GAJEWSKI, S. R. (1938). Klinische Bemerkungen zu Lymphdrüesengeschwülsten. [**Clinical Observations on Lymph Node Tumours**].—*Festschrift Theodor Schmidt*. pp. 47-52. Berlin and Vienna: Urban & Schwarzenberg.

Basing his remarks on malignant tumours in dogs, G. discusses the clinical features of secondary carcinoma, involving lymph nodes draining the site of the primary tumour, including inflammatory changes due to ulceration of the primary growth. Early operative removal of affected lymph nodes together with as much

as possible of the surrounding fat and connective tissue is the most satisfactory treatment; irradiation may be used in addition. The prognosis in cases of lymphosarcomatosis affecting lymph nodes is very unfavourable, and operative treatment is unlikely to be of any use. It is possible, however, that these tumours may be radiosensitive, as is the case in man.—E. G. WHITE.

CHAMPY, C., & LAVEDAN, J. P. (1938). Production de tumeurs par régénération entretenue dans les testicules des oiseaux. [**Tumours in the Testicles of Birds Caused by Regeneration**].—*C. R. Acad. Sci., Paris*. 207. 99-100. [1 ref.]

If birds are castrated so that a small part of the testicle remains, an active process of regeneration sets in. In many cases normal semeniferous tubules are produced, but in some birds neoplastic growth occurs.

The authors kept 15 birds on which this partial castration had been performed, for three years after the operation; four of them developed tumours the size of a man's fist, filling the abdominal cavity and killing the bird; metastasis occurred. These tumours are described as malignant seminomata, arising from abnormal regenerative growth.

The authors suggest that the special interest of these tumours lies in the fact that by observing them, new light might be thrown on the disorganization of the growth factors of the seminal tissue, particularly in the case of the pituitary.

MENSA, A. (1938). Ueber die odontogenen Tumoren der Kiefer. Ein mandibuläres Lymphozystom bei einem Pferde. [**Odontogenous Tumours of the Jaws: Mandibular Lymphocystoma in a Horse**].—*Festschrift Theodor Schmidt*. pp. 110-122. 15 figs. [Numerous refs.] Berlin and Vienna: Urban & Schwarzenberg.

A review of the literature dealing with odontogenous tumours in animals is followed by a detailed description of a very unusual tumour, the size of a man's head, arising from the horizontal ramus of the mandible in a seven-year-old horse. At autopsy, the tumour was found to be composed of multilocular cysts, some of which contained pus, probably the result of previous exploratory puncture, whilst others were lined by a thin membrane. Histologically, the cyst walls were composed of bony and osteoid trabeculae, and lined by myxomatous connective tissue. In the region of the premolar and molar teeth, there was a considerable amount of compact bone, resembling cement. Finally, in the mucoid connective tissue there were numerous lymph spaces lined by a single layer of endothelium. In view of these features, the tumour was classed as a mandibular lymphocystoma, analogous to haemangiomas in this site, of which there are several records in veterinary pathology.—E. G. WHITE.

FORSTER, H. (1937). Zur Bakteriologie und Serologie des Tumorkokkus polymorphus haemolyticus. [**Bacteriology and Serology of *Tumorcoccus polymorphus haemolyticus***].—*Münch. tierärztl. Wschr.* 88. 445-448 and 459-461.

This is an uncritical discussion of the literature on bacillary bodies present in various "tumours". A number of authors are mentioned, but no references are given. F. examined 26 tumours in all, 17 of which were from human and 9 from animal sources. He divides the specimens into 5 groups:—six specimens of papilloma, 12 of carcinoma, 8 of myoma, 4 of sarcoma and one "Ehrlich sarcoma". A coccus was isolated from all cases and was found to be similar morphologically, culturally, biochemically and serologically. The only difference was in pathogenicity, as most strains failed to affect laboratory animals; some

caused death, but not from tumour formation. [These deaths were probably caused by toxic elements present in the cultures injected, as large doses were administered and filtrates also killed. It is unfortunate that no attempts were made to infect animals similar to those from which the tumours originated.] F. refrains from drawing any conclusions as to the aetiology of the tumour conditions.

—P. S. WATTS.

BONNET, C. (1938). *Considérations sur quelques lésions granulaires. [Aetiology of Granular Lesions in Animals].—Thesis, Lyons.* pp. 101. [Numerous refs.]

This is a consideration of the literature dealing with certain local tissue reactions, having some general macroscopic similarity to true tubercular lesions, as found in glanders, various strepto-bacillary infections of cattle, parasitic infestations of lungs and liver, aspergillosis, actinobacillosis, and foreign body reactions.

—N. J. SCORGIE.

## NUTRITION IN RELATION TO DISEASE

MILLER, W. C. (1938). *Some Aspects of Feeding in Relation to Livestock Disease. —Vet. Rec.* 50. 1042-1050. [10 refs.]

At the outset, reference is made to the tendency to systemic upset consequent upon selective breeding of animals for increased production or performance, and to the markedly beneficial effects of adequate exercise upon such animals.

Colic, myoglobinuria, non-specific lymphangitis, urticaria, and some forms of sterility are regarded as diseases which follow overfeeding with balanced foods, especially in the absence of exercise.

Unbalanced rations can be particularly harmful. Gross excess of fat or deficiency of carbohydrate leads to ketonaemia, acetonaemia, and consequently acidosis. Excess of certain proteins will cause an almost identical condition in cows and sheep. Constant excess of protein may also cause intoxication if the detoxicating mechanism fails to function adequately. In M.'s opinion protein overfeeding is general in Great Britain.

Underfeeding leads *inter alia* to rickets, mineral deficiencies, avitaminoses, and higher mortality in parasitic diseases. The indiscriminate use of "balanced" cakes of secret composition is deprecated, and a greater use of sound home-grown material is advocated. The essential importance of freshness of food is stressed, serious deterioration in food value occurring rapidly during storage of all cereal by-products and high-protein foods. Hay is particularly variable in its food value, and in this respect appearances are often deceptive.—D. D. OGILVIE.

EVELETH, D. F., & BIESTER, H. E. (1938). *Blood Chemistry in the Study of Nutritional Diseases of Swine.*—*J. Amer. vet. med. Ass.* 93. 249-254. 4 tables. [12 refs.]

Four groups of pigs were reared on rations containing various proportions of yellow maize and skim milk powder, with chalk, salt, and free access to soil. Low protein groups failed to make adequate growth. The ration was thought to contain no vitamin C [there is no evidence submitted to support this] and analysis showed that the pigs had plasma ascorbic acid contents of the same order as those which had been injected with 1 g. ascorbic acid three days previously. This, in conjunction with the absence of typical lesions of scurvy, is taken to show that pigs have the power to synthesize this vitamin. The pigs were killed off at periods of 118-278 days, and samples of serum and whole blood were collected at death. On the basis of this single blood analysis it is concluded that a tendency to low serum Ca and

protein values is found in pigs on rations low in these substances : the inorganic P figures obtained are thought to indicate a sub-optimal P intake ; an absence of nutritional oedema with low serum protein is recorded.

[The reliability of these conclusions, based on a single series of analyses at death, is very much open to question. It is difficult to understand why systematic blood analyses were not conducted throughout the course of the experiment. In the abstractor's opinion, the value of the experiment is practically negligible and the paper provides a further example of certain conclusions getting into the literature based on very meagre and doubtful experimental evidence].—ALFRED EDEN.

SVANBERG, O. (1937). Beskrivning av treåriga försök till bekämpande av bristsjukdomar hos boskapen i allmogebesättningar på Gotland. [**Report of Three Years' Experience in the Fight against Deficiency Diseases in Cattle on the Island of Gothland**].—*K. Landtbr Akad. Handl., Stockh.* **76**. 354-394. [English summary].

The soil and vegetation of Gothland are characterized by great richness in lime and marked deficiency in phosphoric acid. The symptoms in cattle attributable to deficiency in phosphoric acid on the island are general inanition with depraved appetite, sexual disturbances, difficulties in the rearing of young animals, and wide-spread osteomalacia, the latter being particularly prevalent in dry seasons. Control measures that have proved effective include the application of superphosphate to the soil, the early harvesting of feed crops (since the phosphoric acid content of plants quickly decrease during the ripening period), the use of roots or other succulent crops as a supplement to hay, the administration of 50-60 g. sodium phosphate per day, and the selection of cattle which are resistant to this disease. Sheep rearing is generally a complete failure in affected areas. As regards horse breeding, it would appear that the phosphorus requirements of horses are lower than those of cattle and sheep, but since the soil of lime-rich districts produces a vegetation very deficient in manganese, anaemic conditions in horses are very common [see also *V. B.* **6**. 127].—N. J. SCORGIE.

DUNLOP, G., & WELLS, H. E. (1938). "**Warfa**" ("**Swayback**") in Lambs in North Derbyshire and its Prevention by adding Copper Supplements to the Diet of the Ewes during Gestation.—*Vet. Rec.* **50**. 1175-1182. 1 table, 1 map, 1 appendix. [5 refs.]

"Warfa" or "swayback" affects lambs in a specified area of some 38 square miles in North Derbyshire, leading to a mortality of up to 100%. All breeds of sheep are susceptible, and lambs from ewes of any age may be affected. The incidence varies from season to season, being reduced following a hard winter when concentrates have to be fed to ewes. The disease is not hereditary, nor can lead intoxication be regarded as the aetiological factor. Suspicion that a nutritional factor might be involved led to the feeding of salt licks, containing 0.8% each of Co, Cu, Mn and B, and of each (except B) separately, to ewes on some 38 farms within the area. These ewes were allowed access to the licks at such a level that they received about 1½ lb. of the minerals per head during the gestation period, or about 10 mg. per day. Comparison with untreated controls and with the incidence over the three preceding years showed that the offspring of those ewes which had received Cu supplements had a greatly reduced incidence of the disease (less than 2% compared with 15% in the control groups) whereas Co and Mn were without apparent effect. The suggestion of BENNETTS and CHAPMAN [*V. B.* **8**. 654.] that Cu is an aetiological factor in the incidence of enzootic ataxia (swayback) thus receives some striking confirmation.—A. EDEN.

FORBES, E. B., & JOHNSON, S. R. (1937). **Phosphorus Deficiency in Cattle as a Result of Conditions Other than Low Phosphorous Content of the Soil and of the Feeding Stuffs Grown Thereon.**—*Proc. Amer. Soc. Anim. Prod.* 1937. pp. 340-344. 1 table.

An informal inquiry into the possibility of P deficiency in cattle in parts of Pennsylvania where the soil P is low, showed that P deficiency occurs only occasionally in cattle in these areas (as a result of improper farm practices), and only incidentally and to a very minor degree as a consequence of the low P content of the soil, in so far as it affects the vegetation. The condition may be seen in milking cows improperly fed, and is relieved by supplementary feeding with bone-meal.

—ALFRED EDEN.

CUNNINGHAM, I. J., & CUNNINGHAM, Marion M. (1938). **Dietary Magnesium and Urinary Calculi.**—*N. Z. J. Sci. Tech.* 19. 529-535. 3 tables. [11 refs.]

The authors describe the formation of bladder calculi in rats, due to the ingestion of diets high in calcium carbonate but low in magnesium. The calculi consisted mainly of calcium hydroxide with small amounts of calcium carbonate deposited in an organic matrix, which constituted about 50% by weight of the calculus.

Addition of magnesium to the rations prevented the formation of calculi, despite the presence of excess calcium carbonate. Addition of phosphate to the ration also prevented calculus formation, by preventing excessive absorption of calcium.

It is pointed out that a high serum calcium was one factor necessary for production of the calculi, and that this high serum calcium was associated with high urinary excretion of calcium and an alkaline urine. When high serum calcium was associated with low serum magnesium, calculus formation took place. The hypothesis is advanced that the minor deficiency of magnesium caused slight kidney damage, thus providing nuclei for calculi formation, and that small deposits formed on such nuclei were transported to the bladder, where growth by concretion occurred.—L. W. N. FITCH.

MOORE, L. A., HALLMAN, E. T., & SHOLL, L. B. (1938). **Cardiovascular and other Lesions in Calves Fed Diets Low in Magnesium.**—*Arch. Path.* 26. 820-838. 7 figs. [Numerous refs.]

The experimental calves of DUNCAN, HUFFMAN and ROBINSON [*V. B.* 5. 667.] and of HUFFMAN and DUNCAN [*V. B.* 9. 37.] reared on rations low in Mg so that ultimately the blood Mg was reduced to a low level, showed P.M. a definite pathological picture. Microscopical and macroscopical lesions were in evidence in the aorta and large arteries, endocardium and jugular vein, on the surface of the diaphragm, and in the trabeculae and capsule of the spleen, characterized principally by a deposition of Ca salts in the yellow elastic fibres. There was also some degeneration and calcification of the Purkinje fibres of the heart as well as various degrees of hepatitis and nephritis. A possible connexion between low dietary Mg and arteriosclerosis in man is suggested, and the attention of medical workers is directed to such a possibility.—ALFRED EDEN.

ASKEW, H. O. (1938). **The Value of Cobalt Supplements for Breeding-Ewes at Sherry River, Nelson.**—*N. Z. J. Sci. Tech.* 20. 192A-196A. 3 figs., 2 tables.

An ailment diagnosed as "bush sickness", occurring on granite derived soils in the Sherry River, was found to be preventable in breeding-ewes by the administration of a cobaltized stock lick. The animals received approximately 9 mg. of cobalt per head weekly.—L. W. N. FITCH.

SEEKLES, L. (1937). De interne secretie bij paresis puerperalis van het rund. [**Internal Secretion in Milk Fever**].—*Tijdschr. Diergeneesk.* **64**. 866-872. [Numerous refs.]

The biochemical blood picture in milk fever is considered in relation to recent advances in knowledge of internal secretions and to SJOLLEMA's view (1927) that the disorder can be characterized as a syndrome associated with temporary functional disturbance of the sympathetic nervous system and endocrine organs. Evidence is adduced in favour of the view that hyperfunction of the anterior pituitary is as likely as the hypofunction of the parathyroids earlier suggested by DRYERRE and GREIG [(1925). *Vet. Rec.* **5**. 225]. Injection of the thyrotropic hormone of the anterior lobe of the hypophysis into g. pigs may, as shown by EGGS [(1934). *Dtsch. Z. Chir.* **242**. 321.], cause a fall in serum calcium, while the gonadotropic hormone, according to CANNAVÓ [(1932). *Biochem. Z.* **245**. 234.], causes a rise in serum magnesium in man, dog and rabbit. Hormones of the anterior pituitary are also known to affect metabolism of carbohydrate and fat, and variations in functional activity may explain the variations in blood sugar and rise in acetone often noted in milk fever. Possibly increased production of the lactogenic hormone in milk fever is discussed. Increased pituitary activity is known to occur in late pregnancy and at parturition, and the syndrome of milk fever may arise from a lack of balance between the various hormones secreted.—H. H. GREEN.

SNOOK, L. C., & GODDEN, W. (1938). **The Sugar and Total Ketone Content of the Blood of Ewes and of their New-Born Lambs.**—*Biochem. J.* **32**. 2037-2039. 1 table. [6 refs.]

The sugar and total ketones in the blood of five normal and eight ketonaemic ewes prior to and shortly after lambing are recorded together with the corresponding figures for the blood of the lambs, drawn shortly after birth. The data show that a marked rise in the blood sugar levels of both normal and hypoglycaemic ewes occurred at parturition, although the rise was not so great in the hypoglycaemic animals. The blood of the new-born lamb contained a higher percentage of sugar than that of its dam bled at the same time, but the difference was less pronounced in the lambs from hypoglycaemic ewes than in the case of healthy ewes and their progeny. There was a complete absence of ketone bodies from the blood of the new-born lambs from ewes showing signs of severe ketonaemia.—R. ALLCROFT.

I. FOOT, A. S., GOLDING, J., KON, S. K., CAMPION, J., HENRY, K. M., & HUTHNANCE, S. L. (1938). **The Vitamin Requirements of Pigs with Special Reference to Vitamin A and to Certain Components of the Vitamin B Complex.** pp. 68. 28 figs., 10 plates, 22 tables. [Numerous refs.] Reading: National Institute for Research in Dairying. [4to] [1s. 6d.]

II. HUGHES, E. H. (1938). **The Vitamin-B Complex as Related to Growth and Metabolism in the Pig.**—*Hilgardia*. **11**. 595-612. 5 figs., 3 tables. [Numerous refs.]

I. Pigs maintained for 100 days or longer on a ration shown by experiments on rats to be deficient in vitamin A, developed digestive troubles, an abnormal gait, and marked nervous symptoms, followed in some cases by complete collapse. Five pigs with nervous symptoms were cured by the administration of 100,000-400,000 I.U. of vitamin A daily. Others were cured by the administration of cod liver oil or dried whole milk. Inclusion of vitamin D in the diet did not prevent the onset of the symptoms. The administration of massive doses of vitamin A concentrate was investigated and it was found practical to give a single dose of 400,000-500,000 I.U., which sufficed to keep the pigs in good health on the deficient

diet up to bacon weight. The work from other laboratories is reviewed and the practical value of this investigation discussed.

Two pigs, receiving a synthetic diet deficient in the vitamin B complex, failed to gain in weight, became weak, and had dirty, coarse coats. The addition of 5% brewers' yeast to the diet rendered it satisfactory. Two other pigs which received an addition of 5% autoclaved yeast made very subnormal growth and eventually died; signs of digestive disorders were evident, but there was no nervous collapse.

II. A purified basal diet, adequate except for the factors of the vitamin B complex, caused loss of appetite, exceedingly slow growth, impaired locomotion, lowering of the body temperature and respiratory rate, and sometimes death, when fed to young weaned pigs. Nicotinic acid, when added to this diet together with riboflavin and thiamin, fully protected similar pigs of like weights and ages. Still more rapid growth and weight increase were produced when the filtrate factor (as rice-bran filtrate) was added as well as nicotinic acid.—R. ALLCROFT.

LEPKOVSKY, S., TAYLOR, L. W., JUKES, T. H., & ALMQUIST, H. J. (1938). **The Effect of Riboflavin and the Filtrate Factor on Egg Production and Hatchability.** *Hilgardia*. **11**. 559-591. 5 figs., 17 tables. [Numerous refs.]

Investigations on White Leghorn hens continued over a period of two years showed that to rations composed primarily of cereals, cereal by-products, and fish-meal, the addition of riboflavin promoted egg production and hatchability, but when these were added to a ration composed primarily of polished rice and fish-meal, the egg production and hatchability were decreased. Riboflavin deficiency in breeding hens' diets produced characteristic embryonic abnormalities, such as degeneration of the Wolffian bodies, deformed down, oedema, reduced size, and anaemia.

No significant effect on egg production or hatchability could be attributed to the authors' "filtrate factor", an extract from rice bran containing vitamin G.

—R. ALLCROFT.

BEAUVALLET, M. (1938). Sensibilité à l'acétylcholine de l'intestin grêle isolé du pigeon normal et du pigeon atteint de polyneurite. [Sensibility to Acetylcholine of the Isolated Small Intestine of a Normal Pigeon and of a Pigeon Affected with Polyneuritis].—*C. R. Soc. Biol. Paris*. **128**. 1020-1021. 3 figs. [2 refs.]

Isolated small intestine of the normal pigeon was only slightly sensitive to acetylcholine solutions of a dilution of  $10^{-8}$  and  $10^{-7}$ . Stronger solutions produced contractions which were more marked but of short duration. Addition of vitamin B<sub>1</sub> to the Ringer-Locke solution used for bathing the intestine caused a more marked and prolonged reaction to acetylcholine. There was no appreciable diminution of the sensitivity of the intestine to acetylcholine among pigeons fed on a vitamin B<sub>1</sub>-deficient ration and exhibiting symptoms of polyneuritis, but the reaction was of a shorter duration than in normal birds.—R. ALLCROFT.

NICOLAYSEN, R., & LALAND, P. (1938). **Observations on the Curative Effect of Nicotinic Acid and of Liver in the Canine Black Tongue Disease.**—*Skand. Arch. Physiol.* **79**. 299-302. 1 fig. [12 refs.] [In English].

Blacktongue accompanied by anaemia was produced in two dogs after eight weeks' feeding on a diet composed of Glaxo casein free from vitamin B, arachis oil, white maize meal, cod liver oil, sugar, and salts; crystalline vitamin B (250 I.U.) was injected twice weekly into each dog.

The tongue lesion cleared up on giving 50 mg. nicotinic acid daily, but anaemia persisted until raw ox liver was fed, after which the dogs regained their normal health and weight.—J. E.

- I. THOONEN, J. (1938). Histologische letsels bij hondenrachitis. [**Histology of Rickets in Dogs**].—*Vlaam. Diergeneesk. Tijdschr.* **7**. 281-290. 7 figs. on 3 plates. [3 refs.] [English, French and German summaries].
- II. VERSTRAETE, A. (1938). Roentgenologische beelden bij hondenrachitis. [**X-Ray Pictures of Rickets in Dogs**].—*Ibid.* 291-300. 7 figs. on 4 plates. [6 refs.] [English, French and German summaries].

I. The histological changes seen in cases of osteodystrophia in dogs were :—  
(a) The formation of much osteoid tissue and a few changes in the bone-marrow, indicating rickets, and (b) osteoporosis and the formation of fibrous bone-marrow, indicating osteodystrophia fibrosa. Whether these are independent diseases or two stages of one illness has not been determined.

II. In dogs with rickets the changes revealed by an X-ray photograph largely depend on the rate of growth and on the breed of the dog. Sometimes few changes are found even though the clinical symptoms are definite.

—JAC JANSEN (UTRECHT).

- REZZESI, F. D. (1937). Studi sul rachitismo sperimentale. Nuovi orientamenti etiologici e patogenici indagati mediante esperienze colle sostanze fotodinamiche di origine ematica. [**Research on Rickets: the Action of Photodynamic Substances in the Blood**].—*Biochem. Therap. sper.* **24**. 274-281. [English, French and German summaries].

This is a preliminary note on experiments on the irradiation treatment of rickets in rats. R. believes that the long waves of the visible spectrum can act on certain photodynamic substances in the body, e.g., porphyrin, to reduce or overcome rickets.

For this series of experiments he used haematoporphyrin, a photodynamic substance of animal origin, which is activated only by the green radiations of wavelength 5460 Å and the yellow radiations of 5770 Å of the visible spectrum, and with an already established relationship to the metabolism of calcium. Rachitic rats were used for all the experiments and were fed McCollum's rachitogenic diet. A solution of haematoporphyrin, in varying total amounts, was injected subcutaneously in doses of 0.5 c.c. into the gluteal region. Some of these rats were periodically irradiated by the sun's rays through ordinary window glass; the rest were kept in absolute darkness throughout the experiment. Others which had been kept on the rachitogenic diet, but which were not given any haematoporphyrin, were also kept in absolute darkness. Another group was subjected to similar periodic irradiation, but was not given any haematoporphyrin.

The results of repeated X-ray and histological examinations showed that repeated injections of haematoporphyrin into rats with advanced rickets, followed by successive periods of sun irradiation through glass, led to the disappearance of rickets. There was an early and intense deposition of calcium salts in the rachitic areas. In the absence of light, the administration of haematoporphyrin led to only a slight deposition of calcium salts, especially in the metaphyseal region. The irradiation of rats not treated with haematoporphyrin had no effect on calcification.

## PUBLIC HEALTH

MARTINEZ LANGAN, E. (1936). La inspección veterinaria municipal de la C. Federal. Su acción en profilaxis bromatológica. [**Municipal Veterinary Inspection in Buenos Aires**]. pp. 15. 1 fig. Buenos Aires: Sociedad de Medicina Veterinaria. [40].

An account of the organization and execution of the Municipal Veterinary Inspection work in Buenos Aires. The author discusses at some length improvement that has been brought about in the marketing of animal produce in the city. He draws attention to the opening of the Institute for Food Inspection at which there is physical, chemical, bacteriological, and biological study of foodstuffs.

NARBUTAS, J. (1938). Kauno m. mėsos ir pieno sanitarinė priežiūra nuo 1927 iki 1938 m. sausio mėn. 1 d. [**Meat and Milk Control in Kaunas, 1927-1938**]. --*Vet. ir Zootech., Kovno*. 15. 48-53. 4 tables.

Veterinary inspection of meat and milk products in Kaunas is carried out by the town veterinary surgeon and his assistants. Under his supervision he has 247 meat, sausage and fish shops, 19 sausage and preserved meat factories, 2 factories for fish products, 60 milk products shops, 40 hotel kitchens, one poultry abattoir, 7 markets, 6 tanneries, and one animal cemetery. The tables indicate the quantities of the different products inspected and bacteriologically examined during the year.

—A. PABJANSKAS (KAUNAS).

FLORENTIN, D. (1938). La flore colibacillaire des fromages et les intoxications alimentaires. [**Bact. coli in Cheese and Food Poisoning in Man**].—*C. R. Acad. Sci., Paris*. 206. 1060-1062.

F. investigated several cases of food poisoning in man due to cheese and also made a bacteriological study of cheeses eaten in France. They often contained indol-forming and non-indol-forming *coli* organisms, putrefactive bacteria, and enterococci, but he was unable to isolate any streptococci.

Pont l'évêque cheese which was the cause of cases of food poisoning was shown to contain more than 1,000 *Bact. coli* per gramme of cheese, and some enterococci.

Cooked cheeses of the Gruyère type did not contain *coli* organisms and the partially cooked Dutch cheese contained little or none. In fermented cheese in which mould fungi (particularly *Penicillium glaucum*) are the most active ripening agents, as for example in Roquefort cheese, no *coli* organisms were found, and very few were found in Camembert type cheeses.

In the soft types of cheese such as Pont l'évêque, *coli* organisms were often found. F. found indol compounds in several cheeses with a putrid smell. Their strong taste seems to be due to the presence of indol elements resulting from the action of *coli* on the casein. Certain varieties of *Bact. coli*, and even of salmonella, may form toxins and endotoxins under these conditions.

He concludes that cheese should be made from properly sterilized milk and selected cultures.

GOERTTLER. (1938). Strengere lebensmittelpolizeiliche Vorschriften zur Verhütung von Enteneiervergiftungen? [**Germany: Regulations for the Prevention of Food Poisoning from Ducks' Eggs**].—*Berl. tierärztl. Wschr.* April 8th. 205-208.

About 50 million ducks' eggs are used annually in Germany for human consumption. On an average (calculated for 1932-1937) they were the source of 29

outbreaks a year of food poisoning, involving 174 persons and causing six deaths. Under present regulations in Germany there must be a clear mark of identification and origin on every egg, and the retailer must exhibit a notice warning people of the dangers of uncooked ducks' eggs.

G. reports the case of a producer who voluntarily had the blood of his ducks examined. Between the 12th and the 19th of August, 1936, a bacteriological institute carried out a blood test on all ducks on his farm for *Salmonella enteritidis* and *S. typhi-murium*, and the birds were pronounced free from infection. In November of the same year, however, 29 persons were poisoned by eggs from this farm. *S.e.* was obtained from the faeces of these persons and from five eggs from the farm. A further case occurred in May, 1937. [It is inferred that there were no opportunities for the introduction of infection after the August test.]

G. points out that this is a case where the breeder went to trouble to get a clean bill of health and yet failed to safeguard himself. He concludes that the use of the agglutination test for this purpose is not a safeguard.—A. W. MÖLLER.

### THERAPEUTICS

SCORGIE, N. J. (1938). **The Chemotherapy of Bacterial Infections.**—*Vet. Rec.* **50.** 1012-1014.

A summary is given of the data which have accumulated during the last three years regarding prontosil and other antistreptococcal drugs of the azo series. In human medicine sulphanilamide is regarded as the most generally useful drug of the group, oral administration serving all purposes except the immediate treatment of meningitis.

Drugs of the azo series are specific against infections due to *Streptococcus pyogenes* only, other streptococci being unaffected. Even among *Str. pyogenes*, resistant groups exist. Groups A and C are fully susceptible, Groups B, E, and G are variable in their susceptibility, and Group D is immune.

Among other infective agents, *Staphylococcus aureus* is at least moderately susceptible, and promising results have been recorded against *Clostridium welchii* and *Brucella abortus*. The low toxicity of prontosil and sulphanilamide in animals is emphasized, but toxic symptoms will arise in all species if these drugs are used in conjunction with sulphur-containing drugs.—D. D. OGILVIE.

POSGAY, E. (1936). Adatok a tehenek fertőző hurutos tőgygyulladásának entozonnal való orvoslásához. [Treatment of Mastitis with Entozon].—*Közl. Oesszehas. élet- és kórtan Köréből.* **26.** 545-552.

Infusion of 500-1,800 c.c. of a 1:1250 solution of entozon at body temperature was made into each of 19 artificially infected quarters and nine naturally infected ones. It caused almost complete disappearance of streptococci within 20 hours, but they frequently reappeared 5-6 days later. A complete cure, by means of 1-3 infusions, was obtained in only 14 quarters (56%).—G. SÁLYI (BUDAPEST).

MACRAE, D. R. (1938). **Oral Administration of Brilliant Green in the Treatment of "White Scour" in Calves.—A Record of Three Years' Experience.**—*Vet. Rec.* **50.** 1620-1621.

The author reports that he obtained good results in the treatment of "white scour" in calves with brilliant green, being led to use this drug because of its inhibitory action *in vitro* on coliform organisms.—D. D. OGILVIE.

LABELLE, G. (1938). Le para-amino-benzène sulfonamide dans le traitement de la polyarthrite des jeunes poulains. [Treatment of Polyarthrititis in Foals

**with Sulphanilamide].**—*Bull. Soc. vét. prat. Fr.* **22.** 185-188. Discussion pp. 193-194.

It is stated that joint-ill causes an annual loss of 15-20% in foals in Quebec. L. treated about 200 affected foals, and reports rapid cure in 95% of the cases with sulphanilamide. The dosage for young foals was 15 g. *per os* in 1 g. doses spread over a period of five days, five doses being given on the first day, four on the next, and so on; the drug was mixed with an equal quantity of sodium bicarbonate in a little of the dam's milk. Older animals were treated in the same way, but the dose was 8 g. instead of 1 g. In no case was anaemia noticed, but constipation and itching sometimes occurred, the latter disappearing when treatment was discontinued.

The discussion contains a brief account of the action of sulphanilamide and the possible dangers arising from its use.—N. J. SCORGIE.

PARNES, J. (1938). Beitrag zur Chemotherapie der Lymphangitis epiz. equi. **[The Chemotherapy of Epizootic Lymphangitis of Horses].**—*Berl. tierärztl. Wschr.* June 10th. 335-337. [Numerous refs.]

An account of the treatment of epizootic lymphangitis in 38 horses of which 24 were said to be cured, and three killed as incurable, the rest though apparently cured being still under observation. External and internal treatment were carried out simultaneously. Externally, one or other of the following drugs were used:—concentrated lactic acid, copper sulphate or iodoform in ether followed later by 5% biniodide of mercury ointment. Internal treatment took the form of intravenous or intramuscular injections of 0.25% biniodide of mercury, bismuth iodate, and trypanblue separately, in succession. The course of treatment was spread over several weeks, and was rather drastic in effect. In some cases the horses were given 150-200 c.c. of their own haemolysed blood intramuscularly—presumably as an empirical remedy.—A. W. MÖLLER.

ETTISCH, G., & DA COSTA, S. F. G. (1938). Sur les différences de réaction des substances biologiques aux solutions aqueuses et huileuses d'un même composé. **[Biological Reactions of Helminths to Aqueous and Oily Solutions of the Same Substance].**—*C. R. Soc. Biol. Paris.* **127.** 239-241. [2 refs.]

The authors studied the action of thymol and benzol in both watery and oily vehicles upon *Ascaris lumbricoides* and *Taenia serrata*. Various concentrations of these substances in Rhode-Saito solution of pH 6.4 at 37°C., and in oils (liquid paraffin, olive oil, ground-nut oil, sesame oil, linseed oil and nut oil) were tested as regards their effect on the tonus and frequency of contractions of the worms, and the time taken to produce paralysis.

The action of benzol and thymol in the watery solution was almost identical in each case upon both nematodes and cestodes. The effect of benzol in oily vehicles was more than twice as strong upon the nematodes, whereas thymol in the oily solutions, especially liquid paraffin, was much more active against the cestodes. These findings emphasize the importance of a correct choice of vehicle for anthelmintics.—C. V. WATKINS.

GROULADE, P. (1938). Traitement de la vaginite granuleuse contagieuse par dilatation gazeuse. **[Treatment of Granular Vaginitis by Gaseous Dilatation].**—*Rec. Méd. vét.* **114.** 404-411. 1 fig. [18 refs.]

Contagious granular vaginitis of cattle is stated to be extremely prevalent in France. Ordinary antiseptics are incapable of reaching the organism considered

to be the cause (Hecker's *Streptococcus* studied by OSTERTAG) in the papillae of the vaginal mucous membrane. The treatment advocated consists in the injection, by means of a special syringe, of benzoated  $H_2O_2$  and colloidal silver proteinate in a glycerinated base. Using this method, G. claims to have cured 34 out of 40 cases (38 chronic and 2 acute).—N. J. SCORGIE.

DETLEFSEN. (1937). Anwendung von Aricyl, Tonophosphan und Volkmar'schen Mineralstoffpräparaten. [**Experience with Aricyl, Tonophosphan and Volkmar's Mineral Mixtures**].—*Berl. tierärztl. Wschr.* Sept. 10th. 561-563. [1 ref.]

An article recommending the use of the products named in the title. The only evidence of usefulness was based on general clinical observations.

BUREŠ, J. (1938). Přístroj k podkožní aplikaci kyslíku a jeho použití při kyslíkové terapii koní zasažených b.ch.l. [**Trials of Subcutaneous Oxygen Therapy in Horses Poisoned by Phosgene**].—*Vojs. zdravotn. Listy.* 14. 268-281. 1 fig., 2 tables, 3 charts. [6 refs.] [English, French and German summaries].

B. describes experiments with a Grinkov—a gravity water system with two bottles—apparatus on 16 healthy horses, and on three poisoned with phosgene, the dose being 10-53 mg. given over a period of 15-19 minutes.

Horses can stand a dose of as much as 25 litres of oxygen subcutaneously, but it is advisable not to inject more than 5-6 litres in one place; 80% is absorbed within ten hours, and the rest in 2-5 days. With poisoned horses the absorption took place in about half the time. After large doses of  $O_2$  the pulse was quickened, a danger in the case of horses with pulmonary oedema. It is suggested that in conjunction with other treatment (quiet, warmth, venesection and heart stimulants) the injection of oxygen would be of great value in phosgene poisoning.

After injection of 18-36 litres altogether in two or three doses each distributed over different sites at intervals of 3-6 hours, calm and improvement followed in this experiment, and after two days there were no more symptoms and the pulmonary oedema had disappeared.—V. CHIÁDEK (PRAGUE).

## POISONS AND POISONING

- I. SZABŁOWSKI, J. (1938). Zatrucia koni iperytem przez przewód oddechowy. [**Respiratory Poisoning of Horses by Mustard Gas (Yperite)**].—*Wiad. weteryn.* 17. 385-396. [14 refs.] [French summary].
- II. SZABŁOWSKI, J. (1938). Zatrucia koni adamsytem. [**Poisoning of Horses by DM (Adamsite)**].—*Ibid.* 397-401. [French summary].

I. The symptoms of mustard gas poisoning in horses are, 30 minutes after exposure:—inflammation and blinking of the eyes, swelling of the nasal mucosa, frequent neighing, yawning, heavy breathing and, later, sleepiness. Six to eight hours after exposure the action of the heart is weakened and there is pain in the region of the larynx, accompanied by a choking cough. After 5-6 days, complete blindness ensues, and there is a thick layer of secretion on the nostrils, and ulceration of the skin. The pulse is weak and there is loss of appetite. The respiratory organs are badly affected and there is choking and congestion in the lungs. The flesh of such animals can be consumed by human beings, with the exception of the lungs, if the affected animals are killed within 24 hours of contamination. The best protection for horses is a gas mask. [See also *V. B.* 6. 549; 7. 563, and 9. 184-185.]

II. DM (adamsite; diphenyl aminearsene chloride) is a potent nose irritant gas (arsenical smoke) which affects man more seriously than it does horses. The main symptoms in horses are inflammation of the eyes and respiratory organs, secretion from the nostrils, and, occasionally, coughing and quickened respiration; affected horses are still able to work. In cases of severe poisoning the symptoms are frequent neighing, blinking of the eyes, difficult respiration and quickened heart action. The symptoms usually disappear after 24 hours. Horses killed by adamsite poisoning show congestion of the larynx, blood vessels and heart muscle, but deaths are rare. In most cases treatment will be found unnecessary. Water contaminated by adamsite should not be used.

BONNER, W. G. (1938). **Poisoning of Cattle. Black (or Garden) Nightshade.**—*N. Z. J. Agric.* **57**. 99-101. 1 fig.

Cattle which had been on the road for three days were put into a paddock containing an abundance of black nightshade (*Solanum nigrum*). Two and a half days later, one of the seven cows was found dead, two were down and semi-conscious and the other four were exhibiting symptoms of poisoning. The nightshade plants had been heavily cropped. Three more cows died by the following day. Symptoms and P.M. findings are described. Apparently the only abnormality found P.M. was a doubtful inflammation of the abomasum. The analyst reported the recovery of an appreciable amount of solanine from the stomach contents.

—L. W. N. FITCH.

CARRA, I. (1938). Cecità in ovini e caprini procurata con *Euphorbia myrsinites* Linn. [**Injury to Sheep and Goats by *E.m.***].—*Azione vet.* **7**. 366-367. 1 fig.

An account of injury to the eyes of some sheep and goats, suspected to have been caused by a mentally deficient youth hitting the animals over the eyes with euphorbia plants. The very irritant latex had caused severe inflammation.

CAIRNS, D. (1938). **Vegetative Propagation in Ragwort.**—*N. Z. J. Sci. Tech.* **20**. 173A-183A. 12 figs. [1 ref.]

Anatomical peculiarities of the plant which render eradication difficult are discussed.—L. W. N. FITCH.

## PHYSIOLOGY

DEPPE, K. (1938). Untersuchungen über den Säurebasenhaushalt des Blutes, die Harnreaktion, sowie über Mineralgehalt des Blutplasmas und der Erythrocyten bei Rindern unter verschiedenen Fütterungsverhältnissen. [**The pH of the Blood, Urine Reactions and Mineral Content of the Blood Plasma and Erythrocytes on Different Diets**].—*Arch. wiss. prakt. Tierheilk.* **73**. 303-324. 1 fig., 30 tables. [Numerous refs.]

Cattle fed on sugar beet tops often develop osteomalacia. The work here described was undertaken in order to find any changes which may occur in the alkali reserve or mineral content of the blood. Six groups of cattle were examined:—(a) 12 fed on roots and concentrates; (b) 5 at pasture; (c) 5 fed on silage and concentrates; (d) 5 milk-fed calves; (e) 5 fed on fresh sugar beet tops and concentrates and (f) 14 fed on fermented sugar beet tops and concentrates. Of these, one animal in group (e) and ten in group (f) showed symptoms of osteomalacia.

It was found that the alkali reserve of groups (a), (b), and (c) lay within normal

limits; that of groups (d) and (e) was reduced slightly beyond normal limits while that of group (f) was further reduced. The pH of the blood varied from 7.3-7.4 in group (a) and from 7.15-7.28 in group (f). The pH of the urine fell with the alkali reserve, while the titratable acidity of the urine and the ammonia content rose. The calcium, phosphorus, potassium and magnesium values were lowered in group (f), but the sodium remained constant and chlorides were increased. Wide variations in all estimations occurred with each group. The reduced alkali reserve and the fall in serum phosphorus below 4 mg. %, and the increased titratable acidity and ammonia content of the urine are considered to be diagnostic of sub-clinical or clinical osteomalacia.—A. T. PHILLIPSON.

ROCHE, J., FILIPPI, Angèle, & MORGUE, M. (1988). Sur les réactions générales du squelette consécutives à la fracture d'un os. [**Reactions of the Skeleton after Bone Fracture**].—*C. R. Acad. Sci., Paris*. **207**. 254-257. 1 fig. [1 ref.]

The authors carried out experiments on 57 pigeons to determine whether any general change in bone metabolism occurs during the repair of a single fractured bone. They determined the P:N ratio of the two humeri in 24 normal pigeons, and in 33 pigeons in which one humerus had been broken; they also calculated the phosphatase activity in the same bones. They reached the conclusion that, when any long bone is broken, a greatly increased phosphatase activity can be observed in all the long bones, in addition to other changes in their chemical composition signaled by variations in the P:N ratio. These variations show that there was at first a general fall in the mineral content of the whole skeleton, and finally absorption of phosphates both in the injured bone and in all the other bones.

YOFFEY, J. M., SULLIVAN, E. R., & DRINKER, C. K. (1988). **The Lymphatic Pathway from the Nose and Pharynx. The Absorption of Certain Proteins.**—*J. exp. Med.* **68**. 941-947. 1 table. [15 refs.]

Experiments were carried out on a number of cats, dogs, monkeys and a rabbit, under nembutal anaesthesia, to determine whether various proteins were absorbed by the nasal mucus membrane. Solutions of different proteins were dropped into the nose; the cervical lymph ducts were then cannulated and the lymph subjected to examination for the particular protein by means of the ring precipitin test.

Egg albumin, the protein with the smallest molecular weight of those examined in this study, was found in the lymph in all cases except one, whereas horse serum was never detected. Serum albumin was not found in the lymph of any of the cats, but was present in one rabbit lymph. Although the dye T-1824 is readily absorbed when given in saline, no dye was found in the lymph when a 1% solution in horse serum was employed; a small amount was found, however, when a 5% solution was used, thus confirming previous observations that T-1824 combines with serum proteins. Since no irritant volatile anaesthetics were employed, there was no question of the results being affected owing to damage to the nasal mucosa.—ALFRED EDEN.

## TECHNIQUE AND APPARATUS

DUKES, C. E. (1989). **Examination of Small Quantities of Urine.**—*Lancet*. **236**. 24-26. [4 refs.]

Details are given of a method for the estimation of urea in 0.1 ml. urine, based on the hypobromite reaction, the N<sub>2</sub> liberated being collected and measured in a Van Slyke volumetric gas apparatus. The method has been carefully checked against various urease comparative methods and is sufficiently accurate for clinical

interpretation. By slight variations of stock methods, specific gravity, microscopic and bacteriological examinations, and urea estimations can be carried out on 0.5 ml. samples of urine such as are collected by catheterization of the ureters, and in addition the methods are applicable to the examination of small quantities of discharges to decide whether or not these contain urine. The methods would be particularly suitable for the examination of samples of urine from small animals in clinical and experimental conditions.—ALFRED EDEN.

SIMONS, H. (1938). Nouvelles applications du mélange colorant saponinebleu de méthylène à l'étude des protozoaires sanguicoles. [**New Uses of the Saponin-Methylene Blue Staining Mixture in the Study of Blood Protozoa**]. —*Ann. Parasit. hum. comp.* **16**. 334-340. [6 refs.]

In a further study of the staining properties of his saponin-methylene blue mixture [*V. B.* **8**. 668.], S. found that, when one part of infected blood is added to 5-10 parts of the mixture, trypanosomes or spirochaetes are killed, and together with the leucocytes and stroma of the red corpuscles they are agglutinated into relatively large blue clumps. If these clumps are examined microscopically the parasites can be seen easily, and by differentiation with 0.1 % acetic acid the red cell remnants and the leucocytes can be partly decolorized, leaving the parasites deeply stained. *Leptospira icterohaemorrhagica* stains well with this mixture, and can be easily detected in blood or urine in high dilution. The mixture will also reveal piroplasms in thick smear preparations.

It can also be used as a preservative, so that blood can be kept in bulk and, if required, can be centrifuged prior to examination for parasites. It also stains blood platelets and leucocytes well and may prove of considerable value in haematology.

The stain has the following composition :—distilled water, 300 c.c. ; methylene blue, 0.6 g. ; sodium chloride, 1.8 g. ; sodium citrate, 3 g. ; saponin 2 g., and 15 % formol, 12 c.c. The stain and the salts are dissolved in warm water and after being cooled the saponin is added, the mixture being shaken for some minutes so that it is completely dissolved. Then formol is added to inhibit the growth of bacteria and fungi.—U. F. RICHARDSON.

## MISCELLANEOUS

LEFANU, W. R. [M.A. ; Librarian, R.C.S.] (1938). **British Periodicals of Medicine**. pp. 98. Baltimore : The Johns Hopkins Press. [Reprinted from *Bull. Inst. hist. Med.* (1937). **5**. Nos. 8 and 9, and (1938). **6**. No. 6].

A list of periodicals "issued in all British lands", confined to medicine and its specialities, including anthropology and pharmacy, but excluding veterinary medicine.

—. (1938). **American Type Culture Collection. Catalogue of Cultures**. pp. 159. Washington : Georgetown University School of Medicine. [4th Edit.] [8vo].

The American Type Culture Collection was founded on a collection made in 1911 by the American Museum of Natural History, New York and after sundry moves was transferred to the School of Medicine of Georgetown University, Washington in 1937, where 1,000 new cultures were added, bringing the total to 2,600. This edition of the catalogue covers the enlarged collection.

The functions of the collection resemble those of the National Collection of

Type Cultures, maintained by the Medical Research Council at the Lister Institute, London: the preface contains the rules for persons wishing to send or obtain cultures.

The catalogue material is arranged in alphabetical order of genera, and is based on the nomenclature of the Society of American Bacteriologists.—J. E.

## OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1935). **British Empire Cancer Campaign. Yorkshire Council. Reports and Accounts for the Year Ended March 31st, 1935.** pp. 18. [fcp].

Three lines of research are outlined:—PASSEY's work on gastric papilloma in rats [see p. 488], HAVARD's work on the action of X- and  $\gamma$ -rays on cells, and BONSER's work on heredity in mammary cancer in strains of mice; the two latter investigations were not complete at the time of publication of the report.—J. E.

NEW ZEALAND. (1938). [**Report of Live-Stock Division 1937-38**]. [BARRY, W. C.]—*Rep. Dep. Agric., N.Z., 1937-38.* pp. 9-21. 2 tables.

STAFF.—During the year nine veterinary officers were added to the staff. Still further additions were necessary, but great difficulty was experienced in securing suitably trained men for special investigational work.

## ANIMAL DISEASES

**CATTLE DISEASES.**—The tuberculin test was applied to 16,509 cattle, of which 6.9% reacted. Compensation was paid for 7,207 head of cattle condemned as the result of the tuberculin test or of clinical examination. Of 500,787 cattle examined at abattoirs and meat-export slaughter-houses, 7.38% were affected in some degree with TUBERCULOSIS. The Director stressed the desirability of systematic tuberculin testing with a view to gradual eradication. Fifteen additional farms were found to be affected with JOHNE'S DISEASE. Control still presents difficulties, owing to the uncertainty of diagnostic methods. Control measures by vaccination continued to be satisfactory for BLACKLEG. The usual condemnations are recorded in cases of ACTINOMYCOSIS, ACTINOBACILLOSIS, and malignant growths, compensation being paid in the case of the last-mentioned.

**SHEEP DISEASES.**—Ante-natal vaccination of ewes to protect lambs against ENTEROTOXAEMIA continues. Results are considered satisfactory. Vaccination gives excellent results against CONTAGIOUS ECTHYMA in lambs. Legislation was passed enabling arecoline hydrobromide to be provided for each dog at the time of registration, in order to control HYDATID DISEASE.

Losses from PREGNANCY TOXAEMIA in ewes occurred under the usual conditions of feed shortage. In the lack of adequate supplementary feed the ewes received a severe check just before lambing time. An extremely severe outbreak of FACIAL ECZEMA [PHOTOSENSITIZATION] occurred in the autumn of 1938. The climatic conditions predisposing to the outbreak are recorded, *viz*, an exceptionally warm summer, with dry feed conditions in January, followed by heavy rainfall and rapid growth of grass in February. The disease appeared towards the end of February and was particularly severe in the South Auckland province. An extensive research organization was set up to investigate the disease. Departmental officers are co-operating with officers of the Lincoln Agricultural College in a survey of the causes of mortality in lambs and hoggets in Canterbury.

**SWINE DISEASES.**—Of 1,079,895 pigs slaughtered and coming under inspection for TUBERCULOSIS, 18.41% were affected in some degree. Three chronic cases of SWINE ERYSIPELAS were recorded during the year. SWINE PARATYPHOID is considered responsible for considerable mortality in young pigs.

# SWINE HUSBANDRY

The report of Mr. M. J. SCOTT, Superintendent of the Swine Industry, is appended. The progress of the industry is illustrated by a table giving the total number of pigs killed annually from 1928-1937. This shows an increase from 476,828 to 1,120,905. The number of killings per sow during this time increased from 5·7 to 10·7. Grading of baconers according to standards employed by English bacon-curers was adopted. Grading standards are based on thickness of fat over shoulder and loin.

## VARIOUS

**HORSE BREEDING.**—During the year the Remounts Encouragement Act of 1914, providing for a subsidy to owners of stallions, was put into effect. Good prices for draught horses were being realized, and the breeding of high-class Clydesdales continued. It was felt, however, that legislation ensuring the soundness of draught horses should now be introduced.

**LIVE-STOCK STATISTICS.**—Sheep increased by 1,192,114 to 31,805,818, dairy cows by 15,983 to 1,935,524, and horses increased by 1,629 to 277,799, while pigs decreased by 6,044 to 802,419.

**MEAT INSPECTION AND SLAUGHTER OF STOCK.**—The following stock was slaughtered at registered premises:—sheep, 3,351,208; lambs, 9,957,739; cattle, 588,656; calves, 1,079,572, and swine, 1,085,107.

**IMPORTATION OF STOCK.**—The following stock was imported during the year:—cattle, 55; sheep, 514; pigs, 16, and horses, 38.

**EXPORTATION OF STOCK.**—The following animals were exported during the year:—sheep, 13,716; cattle, 83; pigs, 28, and horses, 8.—L. W. N. FITCH.

**NEW ZEALAND. (1938). [Report of] Veterinary Laboratory, Wallaceville, Year ending 31st March, 1938. [HOPKIRK, C. S. M.]—Rep. Dep. Agric. N.Z., 1937-38. pp. 22-27. 2 tables.**

**CATTLE DISEASES.**—The bromthymol blue test was used extensively as a field diagnostic test for the diagnosis of MASTITIS. The incidence of MASTITIS in the laboratory herd, which included 22 newly calved heifers, is described.

Tests for **JOHNE'S DISEASE** were conducted each half-year on 35 herds. Of 2,956 cows tested with johnin, 3·5% reacted.

**SHEEP DISEASES.**—A serious epizootic of **PHOTOSENSITIVITY** occurred in the Waikato following autumn rains.

No more farms were found infected with **TRICHOMONIASIS**. An experiment was commenced to test the effect of diet on bull fertility. It was chiefly designed to determine the effect of varying concentrations of protein.

In the attempt to control **STERILITY**, work on artificial insemination of cows was continued, but only 39% held. During the year, the semen of 1,170 bulls and of a small number of stallions, boars and rams was examined.

A survey of the cause of sheep mortality in Canterbury was commenced. The sheep were found to be heavily parasitized and **ENTEROTOXAEMIA** was diagnosed not only in lambs but also to some extent in hoggets. Experiments on the toxicity of ragwort were continued.

**PIG DISEASES.**—Three chronic cases of **SWINE ERYSIPELAS** were reported during the year. *Stephanurus dentatus* was reported for the first time in New Zealand. Further experiments are recorded on zinc poisoning.

**PARASITOLOGY.**—Work on blowfly trapping continued, but, owing to shortage of staff, observations on intestinal parasites of sheep was confined to the surveys done in connexion with mortality in Canterbury.

*Myxas ampulla* was shown to be the intermediate host of *Fasciola hepatica* in Hawke's Bay.

DIAGNOSTIC SECTION.—9,860 specimens were examined at Wallaceville and 42,006 (chiefly milk samples) at Hamilton sub-laboratory. The manufacture and distribution of vaccines and sera was carried out as usual. A number of titrations of lambs' sera following active immunization of their dams against ENTEROTOXAEMIA were carried out.

The transmission of MYELOGENOUS LEUCAEMIA by intraperitoneal injections of filtrates and suspensions was demonstrated in fowls.

PASTEURIZATION OF SKIM MILK FOR PIGS.—An experiment was carried out to test the value of a farm pasteurization plant. It was found that milk containing tubercle bacilli, if maintained at a temperature of 170°F. for 30 seconds, was harmless to g. pigs on inoculation.

NUTRITION SECTION.—Work on relation between dietary protein and sterility in rats and pigs was continued.

Magnesium metabolism in relation to the formation of urinary calculi is discussed. Experiments on the physiological action of cobalt were initiated.

During the routine biochemical work 703 specimens of blood, urine, etc., were examined.—L. W. N. FITCH.

NEW ZEALAND. (1938). [Report of] Chemistry Section [1937-1938]. [GRIMMETT, R. E. R.]—*Rep. Dep. Agric. N.Z., 1937-38.* pp. 57-62. 1 table.

BUSH SICKNESS.—The survey of the cobalt status of the North Island pastures was continued and cobalt was used in conjunction with superphosphate in top-dressing experiments in various parts of the Island. Definite improvement in health of stock is claimed, and it was found that the cobalt content of the pasture was increased by as much as ten times, following the application of one-quarter to one-half pound cobalt per acre.

OVINE ENZOOTIC ICTERUS.—Livers of affected animals were found to have a high copper content.

IODINE SURVEY OF NEW ZEALAND LIVE-STOCK.—The work done is described.

PHOSPHORUS DEFICIENCY.—Certain volcanic soils were shown to be very poor in available phosphorus owing to strong phosphate fixation. Sheep and cattle on this country had long exhibited symptoms of pica. Feeding with bone-meal overcame the trouble.

TOXICOLOGY.—Zinc feeding to pigs at levels as low as 0.05% and 0.005% zinc in milk resulted in arthritis and mortality.

An interesting case of suspected arsenic poisoning was reported from the Reporoa district, in which there are a number of thermal and mineral springs. General stock health had been reported to be unsatisfactory. The discovery of arsenic in the mud and water in a drain on one farm led to further investigations, which are still continuing. It was found that the mud deposited by the Waioatapu River was arsenical, the arsenic apparently being present in combination with iron and as sulphide. In drainage waters, arsenic up to 3.75 mg.  $As_2O_3$  per 100 c.c. was found, in mud to 2.5%, in soil up to 0.3%, and up to 2.8 mg. per 100 g. dry matter in grass. In a cow that died under suspicious circumstances the dry marrow and femur contained 0.6 mg. and 0.25 mg. per 100 g. respectively.

CHEMICAL CONTROL OF RAGWORT.—Experiments with sodium chlorate are recorded. It was found very difficult to kill the roots completely owing to poor translocation of the weedicide within the root system. It was, however, possible by this means to reduce the concentration of ragwort considerably and replace almost pure stands of ragwort by productive pasture swards.—L. W. N. FITCH.

**GOLD COAST COLONY.** (1938). **Report on the Department of Animal Health for the Year 1937-38.** [STEWART, J. L.]. pp. 30. 2 tables. 1 map. Accra : Govt. Printer. [fcp] [2s.]

**ANIMAL DISEASES.**—**TRYPANOSOMIASIS** remains the important enzootic disease. Much work has been done in connection with the disease itself and in attacking the tsetse vector by bush clearing. Tartar emetic is the most convenient effective drug. **RINDERPEST** was confined to a few small outbreaks among young stock and the few casualties at the annual anti-rinderpest immunization camps. The usual annual immunization of young stock was carried out. This procedure aims at the production of the very mildest of reactions, and so limits the mortality rate ; tests prove that a satisfactory immunity ensues. 12,194 young cattle were immunized with a mortality rate of just over 2%. There were several outbreaks of **CONTAGIOUS BOVINE PLEURO-PNEUMONIA**. Satisfactory control was effected chiefly due to the efficiency of the anti-pleuro-pneumonia vaccine produced at the laboratory. Mass vaccinations were done in danger areas. Over 50,000 cattle were treated. Short observations are made on other diseases.

**RESEARCH.**—Anti-rinderpest products, contagious bovine pleuro-pneumonia and anti-rabies vaccines, tsetse research and eradication, and examination of pathological materials were the main activities of the Veterinary Laboratory, but other research was also accomplished. A virus disease of poultry not previously experienced was investigated. In some respects it has resemblances to Newcastle disease and contagious laryngotracheitis.

**ANIMAL HUSBANDRY.**—This features largely in the Department's activities. A scheme for the development of the cattle of the Northern Territories, financed by a Government grant and by contribution from the native administration was approved. It consists in the extension of the Native Administration farm plan, which has been proved successful, and the restocking of certain areas with cattle. Considerable progress has already been made ; seven new Native Administration farms are under construction and others are projected, and cattle have been introduced into four new areas. The main object of Native Administration farms is the production of improved bulls for issue to village communal herds. They are also demonstration centres for improved farm husbandry generally. The Departmental livestock farm is the centre for all livestock (cattle, pigs and poultry) improvement activities, including breeding and livestock food experiments. From it improved livestock are issued to Native Administration farms and villages.

Other matters reported on include the marketing of animals and animal products, and veterinary training of Africans.—A. FULTON.

**GERMANY.** (1938). **Sammelbericht der Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten in Hannover.** Berichtszeit 1 April, 1936 bis 31 März, 1938. [**Ninth Report of the Reich Centre for the Control of Diseases of Breeding and Newborn Animals, Hanover, from April, 1936 to March, 1938**]. [MIESSNER, H., SCHOOP, G., & HARMS, F.]—*Dtsch. tierärztl. Wschr.* **46.** 546-559, 561-568. 14 tables.

This report contains the substance of reports sent in by 39 institutes. After a request for the standardization of reports and a list of the individual reporters, the scientific matter follows in the usual form. [The previous report should be seen for comparison—*V. B.* **7.** 290].

#### DISEASES OF HORSES

**STERILITY.**—86,000 mares were examined for capacity to breed, and half of the 19,927 requiring treatment were cured. The customary statistical and therapeutic data are presented.

**ABORTION.**—6,124 investigations were carried out and 11,080 samples of blood were tested for paratyphoid infection, 12.9% being positive. 1,257 fetuses were examined, *Salmonella abortus-equi* was diagnosed in 14.6%, *Bacterium coli* in 5.1%, *Streptococcus pyogenes* in 3.9%, *Bact. equirulis* in 0.5%, micrococci in 5.2%, and a virus in 1.9% [see *V. B.* 8. 716]. In 69% of cases there was no bacterial infection, and these were regarded as due to errors in management and diet. Hormonal diagnosis of pregnancy was applied to 5,700 samples of blood and urine. This is now a routine measure and the results are accurate.

**DISEASES OF FOALS.**—2,512 deaths were investigated, the P.M. findings being given under 17 headings; bacteria were incriminated in about 1,100. Joint-ill in the early days of life (*Bact. equirulis* infection) caused the greatest loss, followed by the so-called late joint-ill (streptococcal infection).

**PARASITIC DISEASES.**—3,758 faecal examinations revealed the presence of strongyles in 76% and ascarids in 19.2%. Infestation of sucking foals confined with their dams indoors is thought to be very common.

#### DISEASES OF CATTLE

**STERILITY.**—Over a quarter of a million bovines were examined and 68,277 required treatment; the percentage of cures varied between 63% and 80%. The causes of sterility, as diagnosed, are given in a table; endometritis and persistent corpus luteum headed the list with 19,000 and 18,000 cases respectively. Trichomoniasis appeared to be on the increase. Numerous individual reports on therapy are quoted.

**ABORTION.**—About 109,000 out of one and a half million blood samples (7.1%) were positive for brucellosis and 20,000 out of 287,000 milk samples (6.9%). Trichomoniasis was incriminated as a cause of abortion in some 1,500 cases and tuberculosis in nearly 500.

**DISEASES OF CALVES.**—Results of diagnostic work on 7,000 calves are listed in a table. *Bact. coli* appears in 23.4% of cases and streptococci in 9.9%.

**PARASITIC DISEASES.**—A short table gives the results of faecal examination from 2,480 ruminants. Stomach worms were diagnosed in 45.6%, and liver flukes in 38.4%, other species being unimportant.

#### DISEASES OF SWINE

**STERILITY.**—Three cases of male sterility are mentioned.

**ABORTION.**—443 fetuses and 290 blood samples were examined; 88.5% were negative bacteriologically and 6 bacterial species were incriminated in the remainder.

**PIGLET DISEASES.**—Over 9,000 carcasses were examined, diagnostic findings being given in a long table. No single cause accounted for more than 10% of deaths. The most frequent causes were heart muscle degeneration, gastro-enteritis, piglet influenza and *Bact. coli* infection.

#### DISEASES OF SHEEP

**STERILITY.**—Nothing to report.

**ABORTION.**—312 aborted fetuses were examined. *Salmonella abortus-ovis* was incriminated in 33%, spirilla in 10.6%, brucella in 2.6% and four other organisms in a few further cases.

**DISEASES OF LAMBS.**—A list of diagnosed causes of death in 2,700 lambs is given. Parasites accounted for 34.6%, pasteurella for 12.2% and the rest had a very diverse aetiology.

**PARASITIC DISEASES.**—Stomach worm disease was on the increase and lung-worms and liver flukes caused great loss in some parts.

# DISEASES OF GOATS

A few lines on sterility and diseases of kids are given.

# DISEASES OF FUR ANIMALS

1,016 foxes, 58 mink, 26 nutria and 13 raccoons were examined.

FOXES.—Short general notes on sterility and abortion are given, also a table with 25 causes of death in 1,016 cases. Lungworms accounted for 11 %, tuberculosis for 10 %, *S. enteritidis* infection for 7.8 %, and management errors for 7.2 %.

MINK.—The chief cause of mortality in 58 animals was gastro-enteritis ; most of the other deaths were caused by TB. and streptococcal infection.

NUTRIA.—26 were examined, and gastro-enteritis, *S. enteritidis* infection and pseudotuberculosis were incriminated each in three cases.

# DISEASES OF POULTRY

Numerous reports are quoted. 32,800 fowls were sent for examination ; the findings are in tabular form. Similar tables are given for 631 geese, 364 ducks, 277 pigeons, 34 turkeys, 11 pheasants and 5 peafowl.—J. E.

GERMANY. (1938). Die Tätigkeit der Staatsanstalt für Tierseuchenbekämpfung in Mödling auf dem Gebiete der Aufzuchtkrankheiten. [**Work of the Mödling Government Institute, Vienna, for the Control of Animal Diseases - Breeding Diseases**]. [GERLACH, F.]—*Dtsch. tierärztl. Wschr.* **46**. 740-744. 8 tables. [3 refs.]

Between April, 1936 and April, 1938, 66,384 diagnostic examinations were performed, 28,000 being for poultry diseases and 25,000 for brucellosis.

BOVINE ABORTION.—Over 20,000 slow agglutination blood tests were carried out : 19 % were positive and 2.8 % doubtful. Similarly, 7.5 % and 1.4 % of 1,000 milk tests were positive and doubtful respectively, whilst one-third of 308 foetuses were positive for brucella infection. Other causes of abortion were trichomoniasis, streptococci, *Corynebacterium pyogenes*, tubercle bacilli, spirillae and *Bacterium coli*.

Trials with a formolized vaccine and a preparation called "Abortotensin" in newly infected herds gave good results in reducing the number of abortions in the next series of pregnancies.

CALF DISEASES.—In 436 calves examined P.M., the following were the chief causes of death :—streptococci, *Bact. coli*, infectious pneumonia and paratyphoid infection.

DISEASES OF LAMBS AND KIDS.—A few cases only were examined, and results are given in a table.

EQUINE ABORTION.—Forty-one aborted foetuses were examined, *Salmonella abortus-equi* and *Bact. coli* each being incriminated in 12 %. A killed vaccine was used on mares which had aborted as a result of *S. abortus-equi* infection.

FOAL DISEASES.—The chief causes of death in 66 foals were streptococci, *Bact. equirulis*, *Bact. coli* and *S. abortus-equi*. For prevention, vaccination of mares was carried out.

POULTRY DISEASES.—Results are given in a table : of 26,458 blood agglutination tests for pullorum disease, only 5.6 % were positive.—J. E.

HOLLAND. (1937). Verslag van den directeur van den veeartsenijkundigen dienst omtrent de werkzaamheden van den veeartsenijkundigen dienst en den gezondheidstoestand van den veestapel in 1936. [**Report of the Veterinary Service for 1936**]. [BERGER, H. C. L. E.] pp. 118. 26 tables. 's-Gravenhage : Algemeene Landsdrukkerij. [4to] [F 1].

The report contains lists of the names of veterinary and other State inspectors

concerned with animal health, and a comprehensive account of prevailing animal diseases, together with information on imported and exported animal products.

**ANIMAL DISEASES.**—The situation with regard to **BOVINE TUBERCULOSIS** is described in detail in texts and tables. The State control is based on the use of the ophthalmic tuberculin test and the building up of clean herds; "open" cases are slaughtered under compensation and other reactors are dealt with according to Bang's method of eradication. The scheme suffered a slight setback during the year on account of financial stringency. There were 23,627 farmers enrolled in the scheme, involving 304,080 cattle. The percentage of infection over the whole country was 16·8, being lowest in Friesland (4·8). The state of affairs in different provinces is described fully. BCG vaccine was used on some farms, with a high rate of reaction.

**JOHNE'S DISEASE** seemed also to have increased.

**BRUCELLA INFECTION** in cattle appeared to be on the increase. **TRICHOMONIASIS** was also noted. **ANTHRAX** and **BLACKLEG** were rather rare.

The history of **FOOT AND MOUTH DISEASE** and **SWINE FEVER** in the different provinces is related. **AUJESZKY'S DISEASE**, which had previously given some trouble in Holland, was not observed in 1936. There were no cases of **SHEEP POX** or **RABIES**.

Other common diseases of farm livestock are described, but do not call for detailed description here.—**JAC. JANSEN (UTRECHT)**.

**HOLLAND. (1937).** Verslag van de werkzaamheden der Rijksseruminrichting over 1936. [**Report of the Rijks Serum Institute for 1936**]. [LOURENS, L. F. D. E.] pp. 100. 1 fig. on 1 plate, 19 tables. 's-Gravenhage-Algemeene Landsdrukkerij. [8vo] [F 1].

This record of the serum institute at Rotterdam gives a summary of the sera, vaccines and diagnostic agents prepared. A report is given of the material sent for diagnosis.

New products were serum, prepared from horses, against *Leptospira icterohaemorrhagiae*, and formolized **BLACKLEG** culture vaccine. The Director considered however, that this vaccine would be no improvement on the products already in use, viz, blackleg filtrate, blackleg muscle powder and blackleg spore vaccine in cotton wool. Another new product was the formolized **SWINE FEVER** vaccine. The report mentions that during the preparation of the vaccine gas-forming bacilli were sometimes troublesome; gas oedema sometimes developed after its use. It is stated that the vaccine was not the cause of this infection, which, it is said, resulted from bad injection technique.

**REESER** did research work on the Dujarric flocculation reaction for the diagnosis of brucella infection in cows. This method was not so satisfactory as the methods of diagnosis already known.—**JAC. JANSEN (UTRECHT)**.

**HOLLAND. (1938).** Mededeelingen betreffende den Gezondheidsdienst voor Vee in Friesland. Negentiende jaarverslag 1 Mei 1937-30 April 1938. [**Report on the Livestock Health Services for Friesland, 1937-1938**]. [VEENBAAS, A. H.] pp. 59. 3 tables. [8vo].

A summary is given of control methods for infectious diseases in Friesland. A comparison of the results obtained in combating **TUBERCULOSIS** during 1937 and 1938 is made, as follows:—in 1937, 9,961 farms (199,372 head of cattle) were examined; there were 23,193 positive reactors (11·6%), while 6,110 farms were proved to be free of **TUBERCULOSIS**; in 1938, 10,800 farms (210,450 head of cattle)

were examined, and 20,270 animals were positive 9.6%), 6,783 farms being free of the disease.

In combating **JOHNE'S DISEASE** the isolation of calves during the first year is considered to be very important; all affected animals should also be isolated. The intradermal test with avian tuberculin gives many doubtful results, but is stated to be the most reliable test available.

161 foetuses and placentas were examined for *Brucella abortus* INFECTION and the organism was found 80 times.

A polyvalent live vaccine was used for immunization of pregnant cows: it gave good results. Intradermal injections with formolized vaccines and with methyl violet vaccines are being tried out.—JAC. JANSEN (UTRECHT).

## BOOK REVIEWS

KELSER, R. A. [Lieut. Colonel, Veterinary Corps, United States Army; Chief Veterinary Division, Surgeon General's Office, War Department, Washington, D.C.] (1938). **Manual of Veterinary Bacteriology.** pp. xiii + 640. 93 figs., 11 tables. London: Baillière, Tindall & Cox. [3rd Edit.] [8vo] [27s. 6d.]

The third edition of this book has been rendered necessary because of its adoption for teaching purposes and because of the extensive advances in bacteriology and immunology in recent years. This branch of biology is a living and interesting study and it is to be regretted that one of the few books devoted to the veterinary aspect of bacteriology is so dull and uninteresting. The student who wishes to delve into the exciting problems of infectious diseases of domesticated animals will find little here to stimulate his curiosity.

There are 12 parts covering a wide field and including the pathogenic fungi, protozoa and viruses. The sections on bacteriological methods, the serological tests commonly employed and the preparation of veterinary biological products could have been curtailed, for such matters can only be learnt adequately at the bench. This would have allowed room for the expansion in immunology which, according to the preface, the author would have liked. There is a good chapter on bacterial variation, but the information given here is not applied in the chapters on systematic bacteriology. The antigenic analysis of the salmonella group is ignored in the description of members of this genus, and the differentiation of the different species is vague and passed off with the phrase "Agglutinin absorption tests are more reliable". Separate descriptions of *S. typhi-murium*, "*S. aertrycke*" and "*S. psittacosis*"—considered by most to be the same organism—are given. Other work of recent years is also omitted, for example:—the antigenic analysis of the brucella group, the toxic fractions formed by the types of *Clostridium welchii*, and the flagellar and somatic antigens of various clostridia. *Actinomyces bovis* is stated to gain access to the body by barley awns and to be responsible for "wooden tongue", whilst the description of the organism savours more of a saprophytic actinomyces. The statement that tuberculosis of dogs and cats is rare, but that when it does occur it is usually found to be due to the human type, is not wholly in accordance with accepted views.

Bergey's classification is used and so, while we have "*Salmonella pullorum*", on the one hand, on the other we have "*Shigella gallinarum*". *Corynebacterium pseudotuberculosis* is given as a synonym for *Pasteurella pseudotuberculosis* and, although there is some explanation on pp. 360-361, the true position of there being a *Past. pseudotuberculosis (rodentium)* and a *Corynebact. (pseudotuberculosis) murium* is not given.

There are short descriptions of the virus diseases, the pathogenic fungi and the protozoa of veterinary importance. Neither in the bacteriological nor in the protozoological sections is there a sufficiently close linkage between the description of the parasite and its association with the disease processes, and the angle of study for the purpose of controlling infectious diseases is thus too narrow.—R. LOVELL.

DOERR, R., & HALLAUER, C. [Editors]. (1938). *Handbuch der Virusforschung. Erste Hälfte. [Text-Book on Viruses. Part I].* pp. xii + 546. Numerous figs. and tables. [Numerous refs.] Vienna: Julius Springer. [8vo] [RM. 66]. [In German and English].

This, the first half of an ambitious work on viruses, is an attempt to fill a serious gap in scientific literature. Research on viruses has advanced rapidly during the last few years, with the result that only specialists are able to keep up to date. A number of these specialists, each in his own language and on his own subject, have combined to produce this book. The authors are all well known as experts in their own lines of research, and the result is a magnificent production which will be of great service to all whose work deals with viruses. The most recent methods and results are described in detail, with a critical review of published papers. There are chapters on:—virus research, the sizes of viruses and bacteriophages, fluorescence microscopy, staining methods for virus particles, inclusion bodies and their relationship to viruses, isolation of viruses in tumour explants, growth of virus on the chorio-allantoic membrane, inactivation of viruses by different agents, and the chemical and physical properties of viruses. A valuable part of each section is a very complete bibliography. The book is well printed, with numerous illustrations—many in colour—of the first quality.—G. SLAVIN.

GRAY, A. A. [M.D., F.R.S.E., Formerly Lecturer on Diseases of the Ear, Glasgow University]. (1937). *The Basis of Tissue Evolution and Pathogenesis.* pp. xix + 92. 11 figs. Glasgow: Jackson, Son and Company. [8vo] [7s. 6d.]

No one who reads this essay will deny that there is much that is attractive in the theory of Induced Variation and its relationship to pathogenesis and directional evolution. Without touching on the question of large-scale changes in environment, such as those which marked the Pleistocene and which culminated in the Psychozoic era, the author is more concerned with small-scale changes like those associated, for example, with the evolution of the muscle-fibres from the epithelium of coelenterates. "A number of animals of a given species are living in a certain environment. All these animals have cells and tissues which possess respectively similar qualities, but no two possess them in identical degrees". If the environment changes the responses of the cells and tissues will, in view of the similarity of their qualities, be of the same general order, but as the cells of similar tissues show small differences between animal and animal there will be a process of selection which will enable those animals with cells of a certain quality to survive the change and to produce offspring which will, on the average, possess the same qualities as the parent. The thesis is based on the belief that the environment is the organic influence in tissue change; the environment changes first and "consequently the qualities of the cells required for survival are rather different in their various degrees than was the case before the environment was changed". The author asks, "how from a limbless animal [fish] has the limbed amphibian arisen?" we know that the terrestrial fore-limb is fore-shadowed in the pectoral fin of the crossopterygian fishes and notably in *Sauripterus Tylori* from the Upper Devonian. By "limbless" the author evidently means a non-terrestrial limb. The emergence of the

primitive amphibian to a sub-aerial medium already existing is an environmental change, and we are safe in saying that such a state is similar to one in which the environment had changed before the transition from aquatic to terrestrial habit had happened. Such a change of environment necessitated a complicated series of readjustments including the strengthening of the supporting structures. It is the process by which change is effected which the author explains as the responses of the component tissues to the injurious effects of wear and tear and altered stresses and strains. The most interesting and authoritative section of the essay refers to the evolution of the mammalian labyrinth. As the author points out "an organ or structure may and often does undergo involution while the species as a whole is undergoing evolution".

The views expressed in this book are of considerable interest, and, although original, and perforce hypothetical, do not appear to cut across those held by contemporary evolutionists. The author tackles the problem of mechanism of change rather than the trend of changes demonstrated by the study (palaeontological and otherwise) of the finished products.—C. HORTON SMITH.

SISSON, S. [S.B., V.S., D.V.Sc. ; Late Professor of Comparative Anatomy in the Ohio State University, Columbus, Ohio ; Member of the American Association of Anatomists ; Fellow of the American Association for the Advancement of Science]. [Revised by] GROSSMAN, J. D. [Professor of Veterinary Anatomy in the College of Veterinary Medicine, the Ohio State University, Columbus, Ohio]. (1938). **The Anatomy of the Domestic Animals.** pp. 972. 770 figs. Philadelphia & London : W. B. Saunders Company. [3rd Edit.] [4to] [55s.]

This new edition does not differ in general from the previous one, except that a section on the anatomy of the chicken has been added—a wise innovation. In detail, however, the book has been much improved, chiefly by some new photographs of dissection preparations of the ox. This is very welcome at the present time, when the horse is losing its pre-eminent position as a subject of anatomy teaching.

As the leading book in English on animal anatomy, it is indispensable to the veterinary student, just as the earlier editions have been in the past.—J. E.

SCHMALIZ, R. [Dr. med. vet. ; bis 1928 Professor der Anatomie an der Tierärztlichen Hochschule zu Berlin]. (1939). *Atlas der Anatomie des Pferdes.* II. Topographische Myologie. [**Atlas of the Anatomy of a Horse. II. Topographic Myology.**] pp. 96. 62 plates. Berlin : Richard Schoetz. [5th Edit.] [4to] [RM. 28].

The plates of this new edition are the same as those of the 1922 edition but the transparent line-drawing pages superimposed on the plates have been re-worded when necessary to bring the anatomical nomenclature up to date.

This splendid aid to dissection can easily be used by people of all nations, as the terms are in Latin and there are only a few footnotes in German.—J. E.

MCCOY, Elizabeth [Dept. Agric. Bact., Univ. Wisconsin], & MCCLUNG, L. S. [George Williams Hooper Foundation for Med. Res., Univ. California]. (1939). **The Anaerobic Bacteria and Their Activities in Nature and Disease. A Subject Bibliography.** (In Two Volumes). pp. xxiii + 295 and pp. xi + 602. Berkeley : University of California Press ; London : Cambridge University Press. [4to] [50s.]

In this work the authors have attempted to compile a full bibliography of anaerobes and anaerobic diseases, from the earliest years of the literature up to

1937. The first volume deals with the matter in chronological order, starting at 1816, and full titles and references in each year are in alphabetical order, authors' names being in heavy type. The second volume is classified elaborately into subjects, and the entries under each subject-heading are in yearly groups, each group being in alphabetical order and including authors' names, journal references, and year date, but not the title of the paper; to find the title, volume I must be consulted.

The main subject-headings are :—habitat or occurrence; culture methods; morphology; metabolism; products of metabolism; physiology; serological studies; disease relations, and classification. Finally, there are extra sections on :—bulletins of institutes which report new data; a list of monographs and review articles; references of personal interest on persons whose work on anaerobes is well known; patents of anaerobic processes, etc.; theses, and a full list of all anaerobes by name. There is also a subject index.

The volumes are printed in typewriter characters on smooth paper, and leave nothing to be desired on the score of clarity and convenience in handling, although certain improvements are desirable in supplementary volumes, which will be produced if the demand makes it practicable. In the subject volume there is only a barely discernible half line space between the year groups: it would be an improvement if the year date were inserted in heavy type, adjacent to the first entry in each year group. From the veterinary point of view, also, there are certain criticisms to be made. In the first place, the various anaerobic infections in the different animals are not dealt with separately, but are simply grouped all together under the headings "Tetanus", "Botulism" and "Gangrene", mixed up with analogous human infections. Thus it would be a very tedious task to collect references to blackleg from this publication. Secondly, many quite important veterinary periodicals have been omitted from the list of those searched, so it follows that many references have been overlooked [this has been verified by consulting *Index Veterinarius*].

These criticisms do not imply that the bibliography as a whole is not to be recommended. On the contrary, the authors are to be congratulated on a very fine piece of painstaking work, and it is hoped that they will be encouraged to continue the work.—J. E.

- (1938). Livro jubilar do Professor Lauro Travassos. Editado para comemorar o 25º aniversario de suas actividades scientificas (1913-1938). [*Collection of Papers on Parasitology and Zoology to Commemorate the 25 Years' Scientific Work of Professor Lauro Travassos, 1913-1938*].—pp. xx + 589. Numerous figs., plates, tables, graphs. [Numerous refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [8vo] [In English, French or Portuguese].

This Festschrift contains some 80 articles by friends of Professor Travassos on zoology, and chiefly helminthology. Some of them are of veterinary interest, and these are noticed in *Index Veterinarius* and in the *Veterinary Bulletin*. There is a biography of Travassos and a complete list of his published works.—J. E.

- FARÉ, C. [Docteur-vétérinaire de la Faculté de Médecine de Paris et de l'École vétérinaire d'Alfort]. (1939). Éléments de matière médicale homoeopathique vétérinaire. [*The Elements of Veterinary Homoeopathic Materia Medica*]. pp. 154. Paris: G. Doin & Cie. [8vo] [Fr. 20].

The book is on the subject named, and follows the usual procedure of its advocates, including an account of about 100 drugs and their use in veterinary practice.—J. E.

# IMPERIAL BUREAU OF ANIMAL HEALTH

THE

# VETERINARY BULLETIN

---

---

Vol. 9.]

August, 1939.

[No. 8.]

---

---

## DISEASES CAUSED BY BACTERIA AND FUNGI

HARE, T., & FRY, R. M. (1938). **Clinical Observations of the Beta Haemolytic Streptococcal Infection of Dogs.**—*Vet. Rec.* 50. 1537-1549.

The authors describe an acute contagious disease in dogs due to beta-haemolytic streptococci. From a study of 128 cases in bitches, dogs and puppies, the clinical picture appeared to be the same whichever type of beta-haemolytic streptococcus was concerned. After an incubation period of 2-7 days, the onset of infection was marked by fever, respiratory catarrh, adenitis and dermatitis with desquamation which usually prolonged the course of the disease. Symptoms were more severe in younger patients, and the mortality rate was high only in the foetus and in puppies up to a fortnight old, born of infected bitches. Reference is made to coincident disease or to complications, e.g. roundworm infestation, nephritis, arthritis and spasmophilia, and to the differential diagnosis from such conditions as dog distemper, parasitic dermatitis and chronic nephritis. Details are given of nine case histories and prophylactic and curative measures are suggested.

A discussion followed in which STEELE-BODGER laid emphasis on the insidious nature of the chronic type of the disease, the common occurrence of haemolytic streptococci in the throat or vagina of clinically healthy animals, and the value of recto-oesophageal lavage with saline in the treatment of complications like gastro-enteritis or spasmophilia. He stated that chronic nephritis is common in kennels in which infection with the haemolytic streptococcus occurs and that it may be due to the streptococcus. An instance was given of sterility and uterine inertia among bitches in a heavily infected kennel being appreciably reduced by the use of autogenous vaccine; the condition was constantly associated with acute pruritus. MONTGOMERIE questioned HARE's opinion that a haemolytic streptococcus is the true cause of the disease conditions described.—R. O. MUIR.

VON ALBERTINI, A., & GRUMBACH, A. (1937). Die experimentelle Streptokokkeninfektion des Kaninchens in ihre Beziehungen zur Herdinfektion. [**Experimental Streptococcal Infection in Rabbits and its Relation to Local Infection**].—*Ergebn. allg. Path. path. Anat.* 33. 314-423. 74 figs. [Numerous refs.]

This is a review of experiments, and is unsuitable for abstraction. The

authors set out to clarify the very confused subject of local infection and to this end they quote extensively and discuss the general literature on this subject, but in the main they confine their review and their own experiments to streptococcal infections. Some of the more important headings considered are :— the importance of variation in relation to the identification of streptococci ; common sites of localized streptococcal infection ; the exact definition of local infection, and a critical analysis of ROSENOW's and WARREN CROWE's contentions regarding the frequency and distribution of streptococcal types. Thereafter follow records of special studies of streptococcal types, the influence of passage, and immunization. The final and probably most useful section of the publication consists of a study of the histopathology of localized streptococcal infection in rabbits, the actual anatomical sites studied including the endocardium, lungs, joints, bones, epiphyses, osteomyeloid tissue, striated muscle, kidney, liver, gall-bladder, alimentary canal, aorta, spleen, eye and brain. [The article lacks an adequate summing-up of the authors' opinions and conclusions, and whilst a certain amount of data has been made available and a useful bibliography has been compiled, the reviewer cannot see that this work throws much new light upon the whys and wherefores of localized infection].—E. J. PULLINGER.

TILLETT, W. S. (1936). **The Differentiation of Human and Animal Strains of Hemolytic Streptococci on the Basis of Fibrinolytic Activity.**—*Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm. 1932-1935.* pp. 230-238.

Fibrinolysin from haemolytic streptococci, whilst acting on normal human fibrin, does not visibly affect fibrin from the blood of laboratory animals. Only streptococci having true beta-haemolysis are fibrinolytic. Cultures of beta-haemolytic streptococci of human origin were highly fibrinolytic, but, on the other hand, animal strains were not. There is a relationship between the infectivity of the organism and its fibrinolytic property, and the presence or absence of this property is a means of distinguishing human strains.—H. E. BYWATER.

WÜSTENBERG, J. (1937). Die Bedeutung der Typendifferenzierung der hämolytischen Streptokokken für die Praxis. [**The Importance of Type Differentiation of Haemolytic Streptococci**].—*Zlb. Bakt. I. (Orig.)*. 140. 83-86.

Type differentiation of haemolytic streptococci is important from a clinical point of view in that it makes it possible to administer the correct homologous antiserum for therapeutic or prophylactic purposes. From the epidemiological viewpoint, typing is important in tracing the source of epidemics and following their course throughout the community.—E. J. PULLINGER.

WARD, H. K., & RUDD, G. V. (1938). **Studies on Haemolytic Streptococci from Human Sources. I. The Cultural Characteristics of Potentially Virulent Strains.**—*Aust. J. exp. Biol. med. Sci.* 16. 181-192. 7 figs., 2 tables. [7 refs.]

The authors have classified haemolytic streptococci isolated from diverse human sources, and stock cultures of all the agglutinating types of Griffith, according to the type of growth obtained in a special serum broth and serum peptone agar. They claim that macroscopic examination of such cultures enabled them to distinguish haemolytic streptococci of Group A from those of other groups. Thus the more laborious technique of the precipitin test may be avoided in routine work. [It is not claimed that this differentiation would be obtained with haemolytic streptococci from animal sources, but to veterinary bacteriologists there is much of interest in this technique which may find a wider application].—T. S. GREGORY.

DRIMMELEN, G. C. (1938). **An Outbreak of an Unusual Type of Anthrax in Cattle in the Eastern Transvaal.**—*J. S. Afr. vet. med. Ass.* **9**. 190-191. [3 refs.]

An outbreak of anthrax is described in which very marked swelling in the throat region, interfering with breathing and swallowing, was noted in affected cattle. Three died and no anthrax bacilli could be found in one, but they were demonstrated in smears from the glands in the throat-region of the second, and in the blood of the third.—E. M. ROBINSON.

BRANDT, A. J. (1938). Miltbrandsepidemien 1937. [**Anthrax in Norway in 1937**].—*Norsk VetTidsskr.* **50**. 4-40. 8 figs. [English and German summaries].

B. first gives a statistical survey of the occurrence of anthrax in Norway from 1889 up to the present time. From the figures quoted it may be seen that the total number of cases varied considerably from year to year, but there has been a definite decrease, only 42 cases having occurred in 1935. The disease occurs sporadically, all over the country and at all times of the year, although most frequently during the latter part of the winter when imported concentrates are fed to the livestock. Such concentrates are incriminated as the main source of the infection.

He then gives a comprehensive report of an outbreak of anthrax that occurred in Buskerud county during the summer months of 1937, in which 103 farm animals (58 horses, 43 cows, and 2 pigs) and one human being were affected. Emphasis is laid on the comparatively large number of horses that were attacked and on the extent to which oedematous swellings occurred along the under surfaces of the body. In no case did young sucking foals contract anthrax from infected dams, and no bacilli could be found in the blood of living diseased animals, although they were easily demonstrated in blood from cutaneous haemorrhages immediately after death. Exact diagnosis was therefore difficult during life.

The locality in which the disease occurred was a typical forest district and the summer in question intensely warm, so that insects of every kind were numerous. All these factors led to the view that blood-sucking insects, especially Tabanidae, played an important role in the transmission of the infection. This theory was strongly supported by the fact that virulent anthrax bacilli were demonstrated in the gut of tabanids collected from anthrax carcasses immediately after death. It was believed that the man who died had contracted the infection through the bite of an infected insect.

In the control of the disease, anthrax serum was extensively used, for both prophylactic and curative purposes. Neosalvarsan and prontosil given intravenously were of no value.—GUSTAV NAERLAND (OSLO).

DE MOULIN, F., & SOEMANEGARA, R. M. (1937). Over den levensduur van miltvuurkiemen in het dierlijk organisme. [**Viability of Anthrax Bacilli in the Animal Body**].—*Ned.-ind. Bl. Diergeneesk.* **49**. 276-298. 2 tables. [10 refs.] [English summary].

In a region like the East Indies, where anthrax is prevalent, the authors thought it of interest to investigate how long anthrax bacilli remain viable in the animal body, and whether they eventually undergo a change in virulence. Experiments showed that, in rabbits which were infected with virulent material, but which had not died, the bacilli became avirulent within a few days, without any spread of the infection. Simultaneous injection of the antiserum caused the disease to take a chronic course. The authors report that, in previously immunized

animals, the grade of virulence of a strain may descend to a level which varies for different animals; in naturally immune animals, however, the virulence is not reduced. In immunized animals, anthrax spores can be demonstrated at the site of injection for a period of at least two months in mammals; in fowls so inoculated the spores survive for six weeks.—C. BUBBERMAN (SCHIEDAM).

DELPY, L., & KAWEH, M. (1937). Transmission de *Bacillus anthracis* à l'homme par *Argas persicus* Oken 1818. [**Transmission of Anthrax to Man by *A.p.***]—*Rev. Path. comp.* **37**. 1229-1234. [11 refs.]

The authors describe a case of malignant pustule in a laboratory assistant who had been bitten on the hand by an *A.p.* nymph. The lesion developed at the site 14 days after the bite and *B.a.* was cultivated from fluid from the pustule. The authors discuss the possible role of the Argasidae in the causation of the unexplainable cases of anthrax in man in Persia.—D. L. HUGHES.

KOSCHUCHAROFF, P. (1938). Die Behandlung des menschlichen Milzbrandes in Bulgarien mit besonderer Berücksichtigung der Immunserumtherapie. [**Treatment of Human Anthrax in Bulgaria, with Notes on Serotherapy**].—*Z. Immunforsch.* **92**. 53-73.

Anthrax is a wide-spread disease in Bulgaria, both in man and in animals; 2,000-3,000 animal cases and 800-1,100 human cases occur annually. In man, the malignant pustule is the form of the infection generally seen. Amongst methods of treatment the intramuscular inoculation of hyperimmune serum is widely used. A course of treatment, which starts with a dose of 25-50 c.c. given twice daily, continues for days or even weeks, gradually increasing doses being given. This is a clinical article, and details of the method used in producing the antiserum are not given.—E. J. PULLINGER.

— (1938). Prophylaxie de la tuberculose des bovidés. [**Circular of 2nd March, 1938, concerning Law for the Control of Bovine TB. (France)**].—*Rec. Méd. vét.* **114**. 429-431.

This circular fixes the amount of compensation to be paid to farmers for the slaughter of those of their cattle which are diagnosed as being tuberculous, and the means by which this compensation is to be paid according to the terms of the law of July 7th, 1938. An extra sum of 6% of the amount paid to the farmer can be paid to the agricultural assurance associations to cover their expenses in supporting the action of the veterinary services.

LOPES DE ABOIM INGLEZ, A. (1937). A tuberculose nos bovinos adultos abatidos no Matadouro Municipal de Lisboa. [**TB. in Cattle Slaughtered at Lisbon Abattoir**].—*Bol. pecuár.* **5**. 73-96. 5 figs., numerous tables, 1 chart.

TB. is the principal cause of the rejection of animals at abattoirs in Portugal. As the result of a year's survey, it was found that 8% of the animals brought to the Lisbon abattoir were tuberculous, but this percentage was less than it should be because of the inadequacy of the examinations made and the lack of a laboratory at the abattoir. The percentages of infected cattle according to their breed and place of origin are compared. Animals from Africa were most often found infected, while the lowest incidence was among those from the north of Portugal.

BARDSWELL, N. D. (1939). **Tuberculosis in Cyprus. (Final Report).**—*Tubercle, Lond.* **20**. 165-193. 12 figs., 10 tables, 15 charts, 8 appendixes. [3 refs.]

It is stated in this article that the Chief Veterinary Officer has reported Cyprus to be now free from bovine tuberculosis.—J. E.

KUWABARA, T. (1938). **Susceptibility of Cats to Tubercle Bacilli.**—*Kitasato Arch.* **15**. 318-329. 2 figs. on 1 plate, 2 tables. [7 refs.]

Erythrocyte sedimentation tests, intradermal reactions, and phagocytic phenomena were studied in about 200 healthy cats, which were then inoculated intravenously or subcutaneously with 0.05-5 mg. of human or bovine type tubercle bacilli. The animals were kept under observation during the succeeding three months, and the reactions noted above were tested from time to time. In addition, body temperatures and weights were observed at frequent intervals. Macroscopic and histological P.M. examinations were made one, two and three months after inoculation.

The cats were immune to the human type of the organism, but were highly susceptible to the bovine type. Intravenous inoculation of 0.05 mg. of the latter strain produced marked lesions in all viscera within a month, and death in three months. Following subcutaneous inoculation, the changes were definite but less marked. There was no change in body temperature or R.B.C. sedimentation rate, and no reaction to the tuberculin test, but in the cats inoculated with bovine type bacilli there was a temperature rise of 0.5°-1.5°C. three weeks after inoculation, followed by progressive loss in weight.

In cats inoculated with 5 mg. of the human type, a few bacilli could be isolated up to two months, but none after three months, and no histological changes could be detected.—D. D. OGILVIE.

GLOVER, R. E. (1938). **Cultural Methods in the Diagnosis of Bovine Tuberculosis.**—*Vet. Rec.* **50**. 981-983. [16 refs.]

G. reviews the use of cultural methods in the diagnosis of T.B. in man, quoting at length an editorial article in the *Brit. med. J.* (1938). Jan. 15th. 126. The general consensus of opinion is that cultural methods are more reliable than the direct microscopic examination of sputum smears in the diagnosis of pulmonary tuberculosis in man.

The value of the microscopic method for the detection of tubercle bacilli in milk is discussed, and comparisons from the literature are made with cultural and biological methods. G. concludes that, although cultural methods have not been widely used for the detection of tubercle bacilli in milk, they might be of use in selected samples.—D. L. HUGHES.

BOQUET, A. (1938). Recherches sur la virulence des bacilles tuberculeux du type humain et du bovin inoculés au lapin par voie méningée. [**Virulence of the Human and Bovine Types of Tubercle Bacilli Inoculated Intrameningeally into Rabbits**].—*Ann. Inst. Pasteur.* **61**. 479-511. 7 tables. [Num. refs.]

The virulence of 41 strains of human tubercle bacilli and 24 bovine strains was compared by the injection of 0.01 mg. of each into rabbits intrameningeally. The bovine strains normally caused paralysis within three weeks, followed by death within a few days. The human strains caused paralysis only in exceptional cases and then after at least four weeks, while death was often delayed for 100 or 200 days. The same results were obtained whether the inoculum consisted of suspensions of infected tissues or cultures. The human strains were found to be of normal pathogenicity on intravenous injection. On the other hand, suspensions of the

meninges of rabbits inoculated with human strains but not showing clinical symptoms caused death when inoculated into g. pigs.—P. S. WATTS.

WELLS, A. Q. (1938). **The Susceptibility of Voles to Human and Bovine Strains of Tubercle Bacilli.**—*Brit. J. exp. Path.* **19**. 324-328. 1 table. [2 refs.] [See also *V. B.* **8**. 840].

A series of voles were injected with falling doses of standard strains of human and bovine tubercle bacilli. Large doses of the human type (1 mg.) produced a progressive disease, but smaller amounts (0.1 mg. and under) were without effect. On the other hand, voles were very susceptible to the bovine strains, of which as small an amount as 0.00001 mg. produced wide-spread disease within four weeks.

These results suggest that the vole is highly satisfactory for the differentiation of human from bovine strains. A dose of 0.0001 mg. injected intraperitoneally should determine within one month whether a strain is of the human or bovine type.—R. E. GLOVER.

BOQUET, A. (1938). Détermination, par l'inoculation au cobaye, de la teneur des produits tuberculeux en bacilles de Koch. [**Determination of the Presence of Bacilli in Tuberculous Products, by Inoculation of Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **128**. 844-846. 3 tables. [3 refs.]

A comparison is made of the numbers of tubercle bacilli in human tuberculous products and caseating porcine and bovine lymph nodes. Equal volumes of finely ground saline suspensions, containing 0.1-0.000001 mg. of material per c.c., were injected subcutaneously into g. pigs and the minimal infective dose determined. The bacillary content of the porcine and bovine products equalled that of human tuberculous pus, but was much less than that of pulmonary lesions in man and in the g. pig.—R. O. MUIR.

BONNET, H., THIEFFRY, S., & MONTEFIORE. (1938). Présence d'un bacille tuberculeux de type aviaire dans un ganglion de lymphogranulomatose maligne. [**Avian Tubercle Bacillus in a Lymph Node in a Case of Malignant Lymphogranulomatosis**].—*C. R. Soc. Biol. Paris.* **128**. 583-585.

The authors report the isolation of avian tubercle bacilli from a mediastinal lymph node taken from a human being affected with Hodgkin's disease. The bacilli showed typical biological characters, and tuberculin prepared from them gave results identical with those given by the avian tuberculin issued by the Pasteur Institute.—R. O. MUIR.

DESSY, G. (1937). La vaccinazione preventiva e curativa della tubercolosi. [**Preventive and Curative Vaccination against TB.**].—*Atti VI Congr. naz. Microbiol., Milan. 1937*. pp. 535-616. [Numerous refs.]

This is a very extensive review with quotations or citations from nearly 600 published articles. It illustrates the enormous amount of research on the immunology of TB., as well as the difficulties concerning the production of a reliable vaccine.

After introductory chapters on natural and acquired immunity, notes are given on vaccines prepared from:—tubercle bacilli killed by heat or chemicals, fractionated antigens prepared from the bacilli, bacilli exposed to sunlight, live bacilli of heterologous type, attenuated bacilli (including BCG), bacilli in the S phase, and virulent bacilli [Belfanti-Dessy vaccine, *V. B.* **9**. 220].

Vaccines etc., for curative use in human medicine are also discussed.—J. E.

SABIN, F. R., JOYNER, A. L., & SMITHBURN, K. C. (1938). **Cellular Reactions to Polysaccharides from Tubercle Bacilli and from Pneumococci.**—*J. exp. Med.* **68**. 563-582. 4 figs. on 1 plate, 4 tables, 6 charts. [18 refs.]

The authors carried out three types of experiment, which are described separately, *viz* :—

(1). Normal and tuberculous g. pigs were given large intracardiac and intraperitoneal injections of tuberculopolysaccharide (separated from the ether-alcohol extract of human tubercle bacilli, strain A-10); the polysaccharides proved relatively innocuous.

(2). Intraperitoneal injections of small amounts of polysaccharides from tubercle bacilli and from pneumococci called forth larger numbers of leucocytes from the blood vessels than did injections of the same amount of dextrose, trehalose or saline.

(3). In order to ascertain the effect on bone-marrow of repeated injections, two normal rabbits received daily intraperitoneal injections, one for six weeks and the other for six months, of 10 mg. of tuberculopolysaccharide from bovine tubercle bacilli, in 1 c.c. of distilled water. The first reaction to these was a withdrawal of leucocytes from the peripheral vessels and a compensatory draining of new neutrophils from the marrow into the sinuses of the marrow; this was followed by a building up of the marrow through the products of disintegration of the extravasated neutrophils.—H. V. HUGHES.

LANGE, L., & PESCATORE, H. (1937). Beobachtungen über die Gewinnung und das Verhalten von Reinkulturen des Paratuberkulosebazillus (Johneschen Bazillus). [**Pure Cultivation of *Mycobacterium johnei***].—*Zlb. Bakt. I. (Orig.)*. **140**. 1-22. 5 tables. [12 refs.]

Growths of *Mycobact. johnei* on various types of medium were compared, and the authors arrived at the general conclusions reached by other workers, namely that media, whether synthetic or otherwise, should contain extract of acid-fast bacillus to ensure good growth. [The experiments which the authors record here are not of great value, because in the study of the growth of *Mycobact. johnei*, either heavy inoculations of pure cultures were used, or else intestinal emulsion was so rich in organisms that these could readily be seen microscopically. Actually the important point is to find a medium which gives the best results when very few organisms are seeded, because the chief problem in John's disease is the diagnosis of early cases of infection in which the organisms are few and widely scattered].—E. J. PULLINGER.

REID, A. H. (1938). **Discussion on Caseous Lymphadenitis of Sheep.**—*Rep. 1st Imp. vet. Conf. Lond., 1938*. pp. 40-41. Weybridge: Imperial Bureau of Animal Health. [5s.]

R. gave an outline of the disease and stated that there was nothing new to report. It is now very rare in imported sheep carcasses examined in London. Mr MAX HENRY described the position in Australia and emphasized what is being done to prevent skin wounds during shearing and the introduction of infective materials to sheep.

Lt.-Col. DUNLOP-YOUNG described the disease from the meat inspection viewpoint and stated that caseous lesions in swine were due to infection by *Salmonella cholerae-suis*. Dr. HOPKIRK spoke of the strict British meat inspection regulations, which demanded the incision of carcasses at New Zealand abattoirs.

—J. E.

BITTARELLI, R. (1987). Le infezioni da "B. pyogenes" nei ruminanti. Contributo sperimentale allo studio dell'azione patogena del "pyogenes bovis" nelle pecore. [*Corynebacterium pyogenes Infection in Ruminants*].—*Nuova Vet.* 15. 65-72. 3 figs.

Bovine mastitis caused by *Corynebact. pyogenes* occurs frequently in Italy. Two types of bovine *pyogenes* tested by experiments on rabbits and sheep showed pathogenic properties; subcutaneous and intramammary injections of broth-serum cultures into sheep were followed by the formation of lesions similar to those of the natural infection. The general symptoms in sheep after intravenous injection of cultures are not serious and eventually disappear. The specific changes in the mammary tissue in experiments consisted of a purulent inflammation with interstitial reaction and degenerative processes of the parenchyma.—HANS GRAF (ZÜRICH).

CORNELL, R. L. (1988). **Pyogenic Infection of Goats and Sheep in Tanganyika Territory.**—*Vet. Rec.* 50. 1658-1657. 2 figs., 1 table. [3 refs.]

An organism having the cultural, biochemical and pathogenic qualities of *Corynebacterium ovis* was isolated from abscesses in sheep and goats and from cases of caseous lymphadenitis. Artificial infection of five goats by intravenous, subcutaneous and scarification methods showed that the native breed had considerable resistance to the organism.—P. S. WATTS.

ROSATI, T., & BERTOLINO, P. (1988). La mastite gangrenosa degli ovini e caprini. [**Mastitis in Goats and Sheep due to *Corynebacterium ovis***].—*Clin. vet., Milano.* 61. 465-473. 4 figs. on 2 plates. [11 refs.]

The authors describe the symptoms and course of the disease as it occurs in France, Italy and Tunis, and the vaccines used for curative treatment. A formolized vaccine was used on six sheep; when exposed to infection at a later date they contracted a mild mastitis. The authors then used the vaccine on 310 affected sheep, of which all but three recovered; when it was used on a flock of 2,250 sheep the mortality was reduced from 45% to 1%. No controls were used.

ROSENWALD, A. S., & DICKINSON, E. M. (1989). **A Report of Swine Erysipelas in Turkeys.**—*Cornell Vet.* 29. 61-67. [10 refs.]

The authors report three outbreaks of *Erysipelothrix rhusiopathiae* septicaemia in different flocks of turkeys in Oregon. All occurred apart from contact with pigs, but on ground used by sheep, although in a district in which no ovine erysipelas infection had been previously determined.

Six strains of the causal organism were isolated by culture under reduced oxygen tension, and their cultural and biochemical characters are detailed. No  $H_2S$  was produced; one strain reduced nitrates. The cultural tests were confirmed by antiserum protection tests in mice. Inoculation experiments in pullets, pigeons and turkeys were made with several of the strains of recovered organisms and a known strain of *E.r.*, the former appearing to be more pathogenic for poultry. A vegetative endocarditis was found in one of the pigeons on P.M. examination, but cultural tests of the lesions for *E.r.* proved negative.—C. V. W.

GRYCH, E., & KSIAŻKIEWICZ, T. (1987). Nosicielstwo włoskowca różycy świń u gołębi po szczepieniach czynno-biernych. [**Persistence of Infection in Pigeons Inoculated with Swine Erysipelas Culture and Antiserum**].—*Pam. pań. Inst. nauk. Gosp. wiej. Puław.* 1. 70-75. 3 tables. [6 refs.] [French summary]. Suppl. to *Wiad. weteryn.* 16.

Pigeons were injected intramuscularly with various doses of S.E. antiserum

on one side of the breast (0.1, 0.2, 0.25, and 0.5 c.c.), and two hours later an intramuscular injection of 0.5 c.c. of a 24-hour culture of *Erysipelothrix rhusiopathiae* was made into the other side of the breast. When the pigeons were killed, 14-36 days after infection, bacilli were found in 21 out of the 1,701 examined.

DELAPlANE, J. P., ERWIN, L. E., & STUART, H. O. (1938). **The Effect of the X Factor, of Sodium Chloride, and of the Composition of the Nutrient Media upon the Growth of the Fowl *Coryza* Bacillus, *Hemophilus gallinarum*.**—*J. agric. Res.* **56**. 919-926. 5 tables. [12 refs.]

In an investigation of the growth requirements of *H.g.* compared with those of *H. influenzae*, the authors cultured an old and a fresh strain of *H.g.* on various media containing different combinations of the factors X, V and C. A table, recording growth in yeast extract and in yeast suspension at the base of nutrient agar slopes, shows that the V and C factors in yeast extract were insufficient for growth and required the addition of blood containing the X factor. Growth tests were also made in broth containing 5% of the serum of various birds and animals, and in the same fluid media at the base of nutrient agar slopes. Several serum broths did not alone support growth, but did so when combined with a nutrient agar slope. The possible role of agar was investigated by testing growth in yeast-blood extracts and serum broths at the base of non-nutrient agar and non-nutrient 0.8% salt agar slopes. Growth occurred at the base of the non-nutrient salt agar slopes only. The given concentration of salt could thus replace the nutrients of nutrient agar in producing growth. Studies of the effect on growth of the addition of 2% NaCl to yeast-blood extract and serum broths indicated that NaCl contributed to growth but was only a partial substitute for agar.

The effect was also noted of the addition of various percentages of NaCl to 5% chicken serum broth used alone and at the base of nutrient agar. NaCl proved essential for growth in an optimum concentration of 1.5-2.0% for both the broth and agar.—R. O. MUIR.

BRANDT, H. (1938). Wachsfaktoren und das Ammenwachstum bei Influenza-bakterien. [**Growth Factors and "Nursery Growth" of Influenzal Bacteria**].—*Dtsch. tierärztl. Wschr.* **46**. 646-649. 1 table. [9 refs.]

B. claims to have shown that fresh horse blood contains a thermolabile factor which can inhibit the growth of haemophilus. Consequently, a suitable medium for the culture of members of this genus must not only contain X and V factors but must also lack the inhibitory factor. [It is not clear from the report whether the inhibitory factor is complement or not]. B. has confirmed the fact that many organisms, including *Bact. coli* and *Salmonella enteritidis*, can stimulate the growth of haemophilus on suitable medium.—E. J. PULLINGER.

RASTEGAR, R. (1938). Sur une souche de *Pasteurella* agent d'abcès enzootiques du lapin. [**Pasteurella as the Cause of Enzootic Abscesses in the Rabbit**].—*Bull. Acad. vét. Fr.* **11**. 365-370. 1 table.

R. describes a condition in laboratory rabbits in which the animals had subcutaneous abscesses, particularly in the inferior maxillary region and in the sub-conjunctival connective tissue. These abscesses were usually encapsulated, but some ruptured through the skin. Some of the rabbits became extremely emaciated and died.

*Pasteurella* organisms isolated from the abscesses were very similar to the typical *Past. septica* strains except that they only produced indol slowly after eight days, and failed to ferment glycerin.

Experimental inoculation showed these organisms to be non-pathogenic to g. pigs, calves, sheep and goats. Intradermal and subcutaneous inoculation in rabbits reproduced the natural disease, but intravenous inoculation gave rise to fibrinous pleuro-pneumonia.—D. L. HUGHES.

FOERSTER, W. (1938). *Pasteurella*-Bakterien als Krankheitserreger beim Menschen. [**Human Infection with *Pasteurella bovis septica***].—*Klin. Wschr.* **17**. 599-603. 2 figs. [Numerous refs.]

A report of two cases of fatal chronic pneumonia in man caused by a *Pasteurella*. Cultural and serological tests and animal inoculation experiments all indicated that the organism was *Past. bovis septica*, one which has not previously been incriminated as a human pathogen. Both the above cases of infection were naturally acquired.

—E. J. PULLINGER.

BARBONI, E. (1937). Contributo alla classificazione delle *Salmonelle* "*Gallinarum*-*Pullorum*". Identificazione batteriologica di 64 ceppi isolati in Italia. [**Differentiation of Italian Strains of *S.g.* and *S.p.***].—*Clin. vet., Milano*. **60**. 741-757. 4 tables. [Numerous refs.] [German summary].

Working with 64 strains of salmonella isolated in Italy, B. agrees with Pacheco and Rodrigues' classification of all the members of the *gallinarum-pullorum* group into five types [*V. B.* **8**. 416], but he arrived at such a classification by adopting a new scheme based on certain biochemical and cultural characteristics, and omitting the fermentation tests on certain carbohydrates, which were variable and unreliable. The strains were subdivided into :—Type I—*S. pullorum* with gas production, 37 ; Type II—*S. pullorum* without gas production, 9 ; Type III—*S. gallinarum* with gas production, 2 ; Type IV—*S. gallinarum* without gas production, 14, and Type V—*S. gallinarum* intermediate, 2. The strain causing bacillary white diarrhoea in turkeys in Italy belongs to Type I.—A. J. CASSAR.

HETZER, H. O. (1937). **The Genetic Basis for Resistance and Susceptibility to *Salmonella Aertrycke* in Mice.**—*Genetics*. **22**. 264-283. 2 figs. [Copied verbatim from *Anim. Breed. Abstr.* **6**. 32. Signed F. GREENSHIELDS].

Following the work of Schott, it is shown that, while resistance to the organisms of mouse typhoid does not seem to be related to age or weight, there is a strong genetic basis, and that individuals differ considerably in their capacity to transmit resistance to their offspring. ♂♂ appear to be more susceptible than ♀♀, but there is no evidence that the genes concerned are sex-linked ; in fact there is nothing indicating linkage with any of the known characters. The genetical data suggest the presence of dominants and genes which operate in a complementary fashion, and that the condition is governed by multiple characters.

— (1938). **Report on the Meeting of Directors of Institutes and Schools of Hygiene, held at Geneva from November 22nd to 27th, 1937.** [Sub-Committee on Brucellosis].—*Bull. Hlth Org. L. o. N.* **7**. 169-190. [3 refs.]

In view of the importance of brucellosis, and in order to make a complete study of the disease, the Committee recommended that various institutes should compile records for submission to the Health Section of the League of Nations Secretariat, which would act as a central bureau. A detailed list follows of the information which should be obtained for these records, and embraces all possible sources of useful information. The list includes brucellosis of cattle, sheep, goats, pigs and horses. The Committee recommended that identical methods should be used in different laboratories in order to facilitate future discussions.—S. J. G.

EVANS, S. A. (1938). **Brucella Infection: Some Further Notes.**—*Rep. Dep. vet. Sci. Tanganyika, 1937.* pp. 23-25. 1 table.

These notes were a continuation of practical observations which were made on a local infected dairy herd during 1934 and 1935 [*V. B.* **6.** 835]. A composite table condenses the observations made on a number of calves (from infected and non-infected dams), from birth to several months, and from the practical experience gained it was concluded that in a self-contained herd "one may expect the disease to reach a latent or cryptic stage. When this stage is reached, here within three years, one may expect up to 100% of viable calves to be available for drafting to clean herds after weaning".

JULLIEN, J. (1937). Sur l'éclosion et la diffusion des brucelloses épizootiques. Passage possible des micro-organismes de l'humus aux invertébrés (annélides), aux végétaux à latex et aux animaux herbivores. (Notes préliminaires). [**Possibility of Passage of Brucella through Soil, Invertebrates, Plants and so back to Herbivora**].—*Bull. Acad. Méd. Paris.* **117.** 330-331. [1 ref.]

J. discusses the possibility of a cycle of infection with brucella through the infected latex of certain plants to certain annelid worms, thence to infected herbivora, and finally to man. He appears to base this theory on the fact that he has isolated a small coccus from the latex of certain Euphorbiaceae and a number of annelid worms. Unfortunately this organism has not yet been identified.

—D. L. HUGHES.

— (1938). Foreløbig meddelelse fra Veterinærdirektøren om resultatet av bekjempelsen av smittsom kastning pr. 30-6-38. [**Result of Bovine Brucellosis Control in Norway up to June 1938**].—*Norsk VetTidsskr.* **50.** 373-378. 2 tables, 3 charts.

Tables and graphs show the progress, up to the end of June, 1938, of the control work on bovine brucellosis in Norway, in the different counties as well as in the country as a whole. The new eradication scheme had then been in operation for three and a half years.

During that space of time, 2,934 herds had been detected and notified as infected. At the end of the same period the control work had progressed so far that 2,843 herds (96.9% of the above number) harboured no positive reactors, and in 2,799 herds (95.4%) the infection is regarded as being eradicated.

There remained 135 herds (4.6%) not released from official supervision. Of these, 44 (1.5%) contained no positive reactors when the last test was performed, and in 52 herds (1.7%) the eradication work was so far advanced that in all probability they would be declared free from infection in a comparatively short time. When the last test was carried out, 91 herds proved to contain positive reactors.

The number of new herds detected and notified as infected had steadily decreased from 162 in the first quarter of 1936 to only 18 in the second quarter of 1938.—GUSTAV NÆRLAND (OSLO).

FITCH, C. P., BISHOP, Lucille M., & BOYD, W. L. (1937). **The Significance of Suspicious Agglutination Reactions for Bang's Disease.**—*J. Amer. vet. med. Ass.* **91.** 22-47. 7 tables. [Numerous refs.]

In these observations a suspicious reaction was taken as one in which the aggl. titre was not higher than 1:100, using the tube method and antigen recommended by the U.S. Live Stock Sanitary Association. The work described in

this paper was commenced in 1929. Altogether 86 animals were used, of which 23 had given a series of negative tests before they developed suspicious reactions; 23 others had been positive reactors, but later the titres had dropped and remained at the "suspicious" range. In 40 others the previous agglutination histories were not known. The animals under experiment were housed with 21 negative pregnant and non-pregnant heifers. Blood tests were performed monthly, and milk examinations by culture and g. pig inoculation were made every two weeks during lactation periods. Colostrum was examined after every calving and placentas ground up and mixed with saline were cultured on gentian violet plates and inoculated intraperitoneally into three g. pigs in each case. Complete records are available for each animal but were too voluminous to publish, so only five of them are dealt with in the article. Complete P.M. examinations were made in the case of ten animals, and samples from the lymph nodes, uterus, udder, spleen and liver were examined by direct culture and by g. pig inoculation. Three of the suspicious reactors became positive to the aggl. test. Two of them aborted and *Brucella abortus* were isolated from the placenta and colostrum. The other was detected in time to remove it from the herd before aborting. The first two had been positive reactors previously and one had shown a maximum titre of incomplete agglutination at 1:100. These three gave positive titres before aborting. None of the 21 in-contact animals became infected, so the authors conclude that most animals having a constant suspicious titre are not dangerous and do not spread the disease to non-infected animals.—S. J. GILBERT.

DIERNHOFER, K. (1938). Das Problem der Immunisierung gegen die Brucellose. [On Immunization against Brucellosis].—*Dtsch. tierärztl. Wschr.* **46**. 659-661.

A general discussion of vaccination against contagious abortion, including a consideration of the use of killed vaccines, bacterial extracts and living organisms. In D's opinion the first two types of vaccine have not proved effective when subjected to critical test. Living vaccines have given better results, but their adoption has obvious disadvantages.—E. J. PULLINGER.

ALESSANDRINI, A., & DOMINICI, D. (1936). Osservazione epidemiologiche sull'andamento della infezione brucellare negli animali dell'Agro Romano. [The Incidence of *Brucella* Infection in the District round Rome].—*Ann. Igiene (sper.)*. **46**. 97-113. [17 refs.]

The authors state that epizootic abortion seems to have been introduced into the Agro Romano by the importation of cattle from Lombardy and Switzerland to improve the local breeds. It is now wide-spread, mainly through ignorance of the importance of the disease and through the efforts of farmers to get rid of infected cattle by selling them. Cases are described on one farm where apparently healthy cattle from Lombardy were introduced into the herd at the end of 1932, without being examined in any way before being put with the other cattle. The first cases of abortion occurred among these cows and later among the original cows also. Five mares on the farm two of which had aborted, were also found to be infected. The animals were tested by agglutination and with Mirri's brucellin, and it was found that most of the animals that were positive to agglutination were also positive to brucellin, which gave fewer doubtful reactions. The authors therefore consider that Mirri's brucellin is an excellent diagnostic agent for brucellosis.

BROCCA, E. (1938). L'infezione brucellare nelle Marche: primo focolaio epidemico. [**Brucella Infection in the Ancona Marches, Italy**].—*Ann. Igiene (sper.)*. **48**. 234-238. [4 refs.]

B. states that the first epidemic form of undulant fever occurred in the Ancona Marches in June 1934. Since then the disease, which is presumed to come from infected cows, has been on the increase. He points out that the hygienic condition of the farm is bad, and emphasizes the value of eradication from the livestock.

—A. J. CASSAR.

ROSATI, T., & DI MINO, G. (1938). Su alcuni casi di orchite di natura brucellare nei caproni. [**Orchitis due to Brucella Infection in Goats**].—*Clin. vet., Milano*. **61**. 581-590. 5 figs. on 2 plates. [14 refs.]

In all cases of serious brucella infection in a herd, the male goats gave a positive reaction to a test with Mirri's brucellin. The authors examined four infected male goats during life, and the testicles of three others sent to them for examination. The animals examined during life showed no abnormal symptoms, except that in one case one testicle appeared slightly enlarged. The characteristic change found P.M. was that of interstitial inflammation, with atrophy of the gland cells. In the worst case there was calcification of the exterior and interior of the testicle. Subsequent microscopic examinations failed to reveal the presence of the organism, and the inoculation of g. pigs with material taken from affected testicles failed to produce brucella infection, except in one instance.—S. F. J. HODGMAN.

LABRANCA, G. (1938). La differenziazione delle brucelle mediante i terreni di Petraghani al verde di malachite ed alla tionina. [**Differentiation of Brucella on Petraghani's Medium with Malachite Green and with Thionin**].—*Ann. Igiene (sper.)*. **48**. 224-233. 2 tables. [15 refs.]

L. considers that Petraghani's medium with malachite green or with thionin is one of the best media for differentiating the various types of brucella. While the *abortus* group does not grow on either medium, the *melitensis* group grows on both, although the growth is more rapid and luxuriant on the malachite green medium. To obtain reliable results, however, the following precautions must be taken:—(a) during the coagulation and sterilization of the medium, the temperature should not exceed 80°C., and (b) in differentiation tests the medium should be inoculated with a loopful of a 72 hours' growth in broth culture.—A. J. CASSAR.

GRÄUB, E., & ZSCHOKKE, W. (1938). "Gleichzeitige aktive Immunisierung gegen Rauschbrand und malignes Oedem mit abgetöteten Vollkulturen". [**Simultaneous Active Immunization against Blackleg and Malignant Oedema with Killed Cultures**].—*Berl. tierärztl. Wschr.* April 15th. 217-218.

A criticism of the work of FREI and RIEDMÜLLER [*V. B.* **8**. 632]. The authors contend that doses of blackleg culture filtrate used by these workers (0.1-2.0 c.c. in g. pigs) are below the limit (3 c.c.) necessary for production of a solid immunity in g. pigs, and that their conclusions are therefore untenable. The effectiveness of blackleg culture filtrate as an immunizing agent, both experimentally and in practice, is stressed, and statistics are quoted in support.—H. E. HARBOUR.

BENNETTS, H. W., & HALL, H. T. B. (1938). Botulism of Sheep and Cattle in Western Australia: Its Cause and its Prevention by Immunization.—*Aust. vet. J.* **14**. 105-118. 6 tables. [9 refs.]

In certain districts in Western Australia, annual losses of sheep and cattle have occurred as the result of the ingestion of material, generally rabbit carrion,

containing the toxin of *Clostridium botulinum* Type C. The sarcophagia is evident during the long, dry summer period, and because of the resultant seasonal incidence of botulism the authors elaborated control methods depending upon the inoculation of two doses of botulinum toxoid (alum-precipitated) before outbreaks are to be expected. They recommend an interval of at least two months between such inoculations, the whole procedure being repeated annually. The results of field trials indicate that although losses among unvaccinated sheep may vary from 5% to 13.2%, those among vaccinated animals are negligible. Experiments indicated that drinking water contaminated with carrion might be a source of intoxication, but there was no evidence to show that this occurred under natural conditions. The addition of 0.2% of quicklime to the toxic water used in the experiments rendered it innocuous to stock.—T. S. GREGORY.

MIHAILESCU, M., & CIUREA, V. (1938). Sur la fermentation du saccharose par le *Vibron septique* et par le *B. chauvei*. [**Saccharose Fermentation by *Clostridium chauvoei* and *Cl. septique***].—*Arhiva vet.* **30**. 35-37. 2 tables. [2 refs.] [In French].

The action of *Cl.c.* and *Cl.s.* on saccharose was studied when the basal medium was either synthetic or meat broth, to both of which liver was added. The percentage of saccharose converted in the synthetic medium varied according to the strain from 10% to 50%, and in the broth medium from 30% to 95%. Both organisms fermented the saccharose, and there was no observable difference between them in this respect.—P. S. WATTS.

ROSSI, P., & SAUNIE, M. L. (1939). Les microbes anaérobies et notamment le *Vibron septique* dans les entéro-toxémies ou ictères toxi-infectieux graves du cheval. [**Anaerobic Bacteria, especially *Clostridium septique*, in Enterotoxaemia and Jaundice in Horses**].—*C. R. Soc. Biol. Paris.* **130**. 511-512. [See also *V. B.* **9**. 458].

The authors discuss the importance of anaerobic infections in horses, which they say is not appreciated. They speak especially of infection with *Cl.s.*, of which ten strains were isolated from cases in horses.

BUTLER, E. J. (1937). *Acladium castellanii* Pinoy and the Existence of the So-Called **Acladiosis of Castellani**.—*Parasitology.* **29**. 259-265. 9 text figs., 2 figs. on 1 plate. [18 refs.]

B. quotes previous records and descriptions of *Acladium castellanii*, a human pathogen which, in the south east of Asia and Europe, and in Brazil, is the cause of an ulcerative skin infection. He describes its morphology when studied in culture on carrot, potato and agar media. He concludes that this organism is closely related to the widely distributed *Sporotrichum schenki*, the commonest cause of human and equine sporotrichosis. He also suggests that if *S. councilmani* is included in the *schenki* species, *A.c.* should also be included, and that in any case the name *acladiosis* should not be used to denote a separate infection; all diseases of this type should be called sporotrichosis.

CZELNY, K. (1937). Badania węzłów chłonnych oraz treści jelit zdrowych koni rzeźnych na obecność mikroflory tlenowcowej ze szczególnym uwzględnieniem grupy okrężnico-durowej. [**Aerobes of the Lymph Nodes and Intestinal Contents of Healthy Horses**].—*Przegl. wet.* **52**. 501-520. 9 tables. [Numerous refs.] [German summary].

Lymph nodes from 100 healthy horses after slaughter were tested for the

presence of bacteria. Out of 1,670, C. found that 1,015 (60·78 %) were infected, and 655 (39·22 %) free from bacteria. The following bacteria were isolated from the lymph nodes :— coliform bacilli in 103 cases, salmonella in 57 cases, Gram-positive bacilli in 882, staphylococci in 106, streptococci in 54, and sarcinae in 92.

Some details are given concerning organisms of the colon-paratyphoid group that were isolated. [No details are given concerning the results of the examination of particular regional lymph nodes, and as they stand the results recorded are of limited value].

## DISEASES CAUSED BY PROTOZOAN PARASITES

STEWART, J. L. (1938). **Animal Trypanosomiasis of the Gold Coast.**—*Vet. J.* **94**. 422-425. 2 figs. on 1 plate.

Flies of the *Glossina palpalis* group are the chief disease vectors. The fly is confined in the dry season to permanent waters with low shade, but spreads over wide areas in the wet season. *G. tachinoides*, a member of the group peculiar to West Africa, is hardy, and occurs in more open country. Common trypanosomes are *Tryp. vivax*, *Tryp. congolense*, and *Tryp. brucei*. *Tryp. simiae* has caused mortality in pigs. The horse is the most susceptible domestic animal ; indigenous cattle are highly resistant, imported zebus less so. Trypanosomiasis causes dwarfism and poorness in local cattle, though its effects may be slight if grazing and watering conditions are good ; it appears to decrease resistance to rinderpest. Tartar emetic is still the most suitable curative drug for the cattle infection. In the horse it is used in conjunction with novarsenobillon in *Tryp. vivax* infection, and with novarsenobillon and naganol in *Tryp. brucei* infection. Attack on the fly by elimination of low shade on permanent streams has been effective in some areas.

—H. E. HARBOUR.

HORNBY, H. E. (1938). **Notes on Nine Cases of *T. brucei* Infection of Cattle.**—*Rep. Dep. vet. Sci. Tanganyika*, 1937. pp. 94-95.

*Tryp. brucei* infection appears to be of little importance in Tanganyika as compared with *Tryp. congolense* and *Tryp. vivax* infection. H. concludes :— "Although *T. brucei* infection may be, and no doubt often is, of a transient nature in cattle, it may also be of a severe and even fatal nature. Cure appears to be easily effected with either Antrypol, Styryl 814 or Surfen C".—S. A. EVANS.

BROWN, A. A. F. (1938). **Trypanosomiasis Gambiensiis. Some Observations in Uganda and their Bearing on Prophylaxis.**—*J. trop. Med. (Hyg.)*. **41**. 200-207, 220-222, 234-237, 247-251, 265-270, 281-286 and 296-301. 8 figs., 1 table. [Numerous refs.]

B. describes the situation in regard to human sleeping sickness in the West Nile district of Uganda. In this area *Glossina palpalis* is confined to the immediate neighbourhood of streams, and is in constant restless movement along their courses. It appears that this tsetse is only just able to maintain its existence and has to be in constant movement to find suitable conditions. Clearings 10 yds wide along the banks of streams are sufficient to reduce the fly to a catch of ten per boy-day. It is advocated that long clearings should be undertaken, 1,000 or 2,000 yds by 10 yds, in order to prevent the movement of fly along the course of rivers, and to isolate relatively small uncleared areas in which the tsetse could be reduced by trapping and catching. Clearing should commence at the head waters of a river and proceed downwards to avoid driving the tsetse up the tributaries. Erosion

of clearings is best prevented by controlled grazing which promotes rotation of grasses and establishes creeping varieties, and thus maintains the clearings. It is also pointed out that livestock act as a biological barrier, and that instead of removing livestock from rivers for fear of attracting tsetse, they should be deliberately introduced. The erythrocyte auto-agglutination test was tried experimentally as to its value in diagnosis of infection. Of 201 persons found infected on examination of the lymph nodes, 70% were positive, 18% doubtful, and 12% negative, whereas in controls, believed free from infection, 4% were positive, 20% doubtful, and 76% negative.—U. F. RICHARDSON.

DE CAMELIS, F. (1936). Contributo alla conoscenza della trypanosomiasi virulenta del maiale. [**Porcine Trypanosomiasis**].—*Arch. ital. Sci. med. colon.* **17**. 185-192.

The author studied an outbreak of trypanosomiasis in pigs in the Belgian Congo, of which the symptoms were:—severe dyspnoea with a marked rise in temperature, extensive salivation and frothing, general weakness and paralysis of the limbs, and sometimes diarrhoea. Infected animals usually died the same night, but there was also a subacute form in which the course was longer and more gradual, and the animals usually recovered after about a week.

At P.M. examination the liver and spleen were congested and the mucous membrane of the stomach and intestines was reddened and congested in patches. The blood was dark red, and coagulated slowly. Trypanosomes resembling *Tryp. congolense*, *Tryp. dimorphon* and *Tryp. simiae* were found. Three healthy pigs of the same herd were infected with blood from infected pigs; two died in three days with typical symptoms, and the same organisms were seen in their blood, but there is no mention of what happened to the third pig.

The author considers that *Tryp. dimorphon* and *Tryp. simiae* are variants of *Tryp. congolense*.

BINNS, H. R. (1938). **Observations on the Behaviour in Laboratory Animals of *Trypanosoma congolense*** Broden, 1904.—*Ann. trop. Med. Parasit.* **52**. 425-430. 2 tables. [7 refs.]

B. records his observations made in connexion with inoculations of laboratory animals to obtain strains of *Tryp. congolense* for experimental investigation. The material was obtained from seven strains of *Tryp. congolense* causing disease of cattle in Nyasaland. Inoculations of rats, g. pigs, or rabbits were only made if active trypanosomes were found in fresh blood smears of the ox immediately before inoculation. The results showed that there is a considerable difference in the susceptibility of individuals to this trypanosome, and indicate that different strains of *Tryp. congolense* appear to vary enormously in pathogenicity.—M. L. BINGHAM.

JANSSENS, P. G. (1936). Contribution expérimentale à l'étude de l'influence du chauffage au bain-marie et des ondes courtes, seules ou en association chimiothérapique, sur une souche arsénorésistante de "*Tr. gambiense*". [**The Effect of Heat and Short Waves, Alone or in Association with Chemotherapeutic Agents, on an Arsenic-Resistant Strain of *Tryp. gambiense***].—*Rev. belge Sci. méd.* **8**. 400-440. 10 tables, 43 charts. [Numerous refs.]

An arsenic-resistant strain of *Tryp. gambiense* was passaged through g. pigs, and another group of g. pigs in which a non-arsenic-resistant strain was passaged was kept as a control.

To check the effect of heat on trypanosomes *in vitro*, blood was taken from the infected g. pigs when dark-ground illumination showed 4-6 parasites per field,

mixed with twice its own quantity of saline solution, and kept in a water bath for various periods at various temperatures. The trypanosomes were not affected in number or vitality by heating to 40°-43°C. for 10-15 minutes, but when heated to 44°C. or more for ten minutes, their vitality declined.

For the second series of experiments the g. pigs were exposed to several irradiations of short waves of 15-19 m. or 4 m. J. found that the administration of trypanarsyl combined with short wave irradiation did not diminish the arsenic resistance of the trypanosomes or influence the course of the infection.

ZWEMER, R. L., & CULBERTSON, J. T. (1939). **The Serum Potassium Level in *Trypanosoma equiperdum* Infection in Rats: The Role of Potassium in Death from this Infection.**—*Amer. J. Hyg. Sect. C.* **29.** 7-12. 1 fig., 2 tables. [16 refs.]

The authors showed that during infection of rats with *Tryp. equiperdum*, there is an increase in the serum potassium level, a decrease in the number of erythrocytes in the peripheral blood, and a lipoid depletion of the adrenal glands. The significance of these factors is discussed, and it is suggested that the elevated serum potassium may be an important factor in the cause of death. It is apparently of endogenous origin, and in view of the marked decrease of erythrocytes, may be derived from the red blood cells.—M. L. BINGHAM.

I. BOZZELLI, R. (1936). Su alcuni casi di Leishmaniosi viscerale del cane osservati in Messina. [**Canine Leishmaniasis in Messina**].—*Riv. sanit. sicil.* **24.** 869-874.

II. ANON. (1936). Leishmaniosi viscerale del cane. [**Visceral Leishmaniasis in Dogs**].—*Clin. vet., Milano.* **59.** 676-684. 3 figs.

I. The author studied the incidence of leishmaniasis in dogs brought for treatment (general patients) to the veterinary college at Messina. The cases observed were all affected with the so-called visceral form of *L. donovani* infection. The general symptoms of this form of leishmaniasis are described.

II. This is a précis of I.

I. ANDREWS, J., & MILLER, F. W. (1938). ***Trichomonas foetus* in Bulls.**—*Amer. J. Hyg.* **28.** 40-50. 1 table. [18 refs.]

II. STEWART, Helen M. (1938). **Glycogen Content of a Flagellate of Cattle, *Trichomonas foetus*.**—*Ibid.* 80-84. 1 table. [7 refs.]

III. ANDREWS, J., & VON BRAND, T. (1938). **Quantitative Studies on Glucose Consumption by *Trichomonas Foetus*.**—*Ibid.* 188-147. 3 tables. [7 refs.]

I. Fourteen bulls in one herd and one other bull were examined once or more during life, and three of them P.M. and *Tr.f.* was found in eight by microscopic and cultural tests.

In none could parasites consistently be demonstrated by the methods used. Best results were obtained by examination of seminal fluid, then of spermatozoa, and lastly of the washings of the sheath. The genitalia from 100 bulls after slaughter for meat were also searched for these parasites, with negative results.

In order to study the localization of infection in the genital system, one bull was anaesthetized and material taken by puncture from the testes, epididymis and seminal vesicles, all giving negative results. In this animal *Tr.f.* was only found on the penis and prepuce P.M. According to the authors' findings, infection of bulls is chronic (present during 11 months of sexual rest in one bull). Measures of control of the disease are discussed.

II. S. observed that *Tr. foetus*, stained with iodine, showed diffuse glycogen

inclusions. This article describes the relationship between the amount of glycogen present and the longevity and disappearance of *Tr.f. in vitro*, as shown by the number of motile organisms per c.c. of culture medium when examined every 12 hours and estimating proportionally those containing glycogen. The latter increased until the maximum growth was obtained, and then decreased. Death of *Tr.f.* coincided with a decrease of those containing glycogen, and was not due to an exhaustion of either carbohydrates or serum or both in the test medium (dextrose serum broth).

III. The authors studied the glucose utilization of *Tr.f.* They determined the sugar at the beginning and end of each experiment, and the daily fluctuations of organisms present. The average rate of glucose consumption was found to vary, being high (over 300 mg. per billion) during a 24-hour period in which the number of organisms was increasing, and low (under 200 mg. per billion) when they were dying out in culture.—C. V. WATKINS.

- I. CASE, C. H., & KEEFER, W. O. (1938). **Some Ways to Detect and Prevent the Spread of Trichomoniasis in Cattle.**—*J. Amer. vet. med. Ass.* **93**. 239-240. 1 fig.
- II. DIKMANS, A., & POELMA, L. J. (1938). **Bovine Genital Trichomoniasis with Special Reference to Diagnosis.**—*Ibid.* 362-366. [1 ref.]
- III. McNUTT, S. H., BLOHM, F., & BARGER, J. A. (1939). **Incidence of Trichomonas Foetus Infection in Iowa.**—*Vet. Med.* **34**. 40-42. 1 fig. [Num. refs.]
- IV. GARLICK, G. G. (1939). **Transmission of Bovine Venereal Trichomoniasis through Artificial Insemination.**—*Ibid.* 43-44.

I. Newly purchased bulls should be tested for trichomonads by being allowed to serve two or three virgin heifers. Swabs from the latter should then be examined after 12-20 days. Direct swabbing of the sheath of the bull for the collection of material is less reliable. In cases of abortion, examination of the placental fluids often leads to a positive diagnosis, but best results follow examination of the mucus at the base of the tongue of the aborted foetus.

II. The diagnosis of bovine genital trichomoniasis is usually based on the breeding history both of the individual and of the herd. Demonstration of the organism is necessary, however, to make the diagnosis complete. Immediate microscopic examination of vaginal mucus or of preputial exudate is the most direct method. Otherwise the material may be mixed with saline and a few drops of 1:40 aqueous iodine solution and sent to a laboratory for cultural examination. As a rule, *Tr. foetus* may be demonstrated with ease following early abortions, but swabs taken after 48 hours may be negative. Cows which fail to breed and in which the organisms cannot be demonstrated should be re-examined on the second day of the oestral period, when relaxation of the cervix has occurred. Chronic infections in bulls usually give negative swabs, but diagnosis may be made by examination of heifers 2-6 weeks after service by the bulls concerned, when a vaginal infection is easily demonstrable if present.

III. A survey of cows and heifers in Iowa showed the incidence of trichomonas infection to be very low. Out of 637 cows and heifers examined immediately after slaughter only four heifers were infected, and these all came from the same farm. Trichomonads occurred in the vagina only, and caused subacute vaginitis with slight nodulation. None of the 289 sows and gilts examined was infected.

IV. A description is given of two cases of transmission of trichomoniasis by semen obtained from an infected bull for artificial insemination. In the first case

a three-year-old cow which had already one normal calf failed to conceive after repeated insemination with infected semen. Autopsy failed to reveal any genital abnormality; *Trichomonas foetus* was cultivated from the vagina, but not from the uterus. In the second case a three-year-old cow which had borne two normal calves was found to be infected with *Tr.f.* 15 days after insemination.—D. D. O.

ŠNIČKIENE, P. (1937). Galviju kokcidijozės atsitikimas. [**Coccidiosis in Cattle**].—*Vet. ir Zootech., Kauno*. 14. 267-270. [3 refs.]

A clinical description of cases of coccidiosis. Dosage with ichtargan, 1 g. daily plus the administration of an unspecified amount of a 0.5% solution *per rectum*, is advocated.—A. PARIJANSKAS (KAUNAS).

LAMBERT, F. R. (1938). L'entérite coccidienne du chien. [**Enteritis due to Coccidiosis in the Dogs**].—*Thesis, Toulouse* pp. 84. 6 figs., 1 table. [Numerous refs.]

An excellent survey of the physiology and pathology of diarrhoea is given, together with a review of coccidia in general and the diseases they produce. Although the role of coccidia in disease is sometimes uncertain, their incidence in normal dogs, as given by various authors, varies from 3-16%. In 54 dogs with diarrhoea the authors found 35% with coccidia, in all cases *Isospora bigemina*. The predilection site is the mucous membrane of the small intestine covering Peyer's patches. In cases of persistent diarrhoea in the absence of fever, coccidiosis should be suspected and the faeces should be examined. Most harm is caused in young dogs, since the parasite is usually associated with other infections such as distemper; older dogs carry the coccidia but show no symptoms. Treatment with a mucilaginous solution of thymol 1 g. and tannoform 2 g., together with a light milky diet, is advocated, suitable control measures being also adopted.

—S. F. BARNETT.

RAY, H. N. (1938). On the Nuclear Structure of *Babesia bigemina* (Smith and Kilbourne).—*Indian J. vet. Sci.* 8. 183-186. 5 figs. on 1 plate. [8 refs.]

R. suggests that conflicting opinions on the nuclear structure of *B.b.* have resulted from the use of dry smears stained with Romanowsky stains. Using wet smears fixed in various fixatives (Bouin, Schaudinn, Carnoy, Bouin-Duboscq-Brasil), and Feulgen's nuclear reaction, the nucleus is shown to be at the narrow apical end of the pyriform body, and to consist of a karyosome surrounded by a cirlet of fine granules, arranged at the periphery of an achromatic nuclear membrane. These facts are against the theory of flagellate origin of the parasite propounded by DENNIS [(1930). *Univ. Calif. Publ. Zool.* 33. 179]. A large granule sometimes seen at the broad end was shown by various staining methods to contain a substance allied to glycogen, and is thought to be a product of metabolic activity of the parasite and therefore variable.—H. E. HARBOUR.

QUIN, A. H., Jr. (1938). A Herd Condition of Swine Characterized by Icterus and Anemia.—*J. Amer. vet. med. Ass.* 93. pp. 927-928. [1 ref.]

Q. describes a herd disease of growing pigs characterized by splenic enlargement, generalized jaundice, and anaemia, which he considers due to a piroplasm or an anaplasma. According to DOYLE [*V. B.* 5. 127.], rickettsia-like or anaplasma-like bodies are present in the red cells. Q. suggests that further investigations are necessary.—J. A. GRIFFITHS.

ADLER, S., & ELLENBOGEN, V. (1934). **A Note on Two New Blood Parasites of Cattle, Eperythrozoon and Bartonella.**—*J. comp. Path.* **47**. 219-221. 2 figs. [3 refs.]

The authors state that they found *Eperythrozoon*, a parasite of the red cells first observed in splenectomized mice and never before in ruminants, in the blood of a calf. The animal had been infected with *Theileria annulata*, and splenectomized a month later; three days after splenectomy a few red cells were found infected with *Eperythrozoon*. Within another six days 90% of the red cells were infected, but four days after this peak had been reached the infection disappeared. When the infection was at its height, the temperature was 40-40.6°C. In a second calf injected with blood from the first and then splenectomized, a similar condition developed. In both animals there was a marked anisocytosis. Up to 50 or 60 parasites might be found in one red cell, and clusters were occasionally found in large mononuclear leucocytes. In outline the organism resembles *E. coccoides* of mice; the authors have named it *E. wenyoni*.

*Bartonella* has been recorded in man, dogs, and several rodents, but not previously in ruminants. The authors found this parasite in a calf inoculated 18 days earlier with *T. annulata*, and it persisted for three days, the number of infected red cells being less than one in 1,000. The organism resembles *Bartonella muris*; the authors have named it *Bartonella sergenti*.

NIESCHULZ, O. (1938). Ueber eine Bartonella-Infektion beim Rinde. [**A Case of Bartonella Infection in Cattle**].—*Z. InfektKr. Haustiere.* **53**. 175-179. [8 refs.]

A parasitic infection, commencing 16 days after inoculation and reaching its height in 21 days, was encountered in the blood of calves inoculated with various piroplasms and anaplasms. No febrile reaction was produced, but the bartonella organism was thought to be responsible for anisocytosis. The organisms appeared as cocci or vesicular forms with a diameter of 0.3-0.5 $\mu$ , either overhanging the edge of the red blood corpuscles or distributed over their circumference. They occurred singly, or as pairs or short chains. The organism is considered to belong to the genus *Bartonella* on account of its resemblance to *B. canis*, as described by REGENDANZ and REICHENOW [(1932). *Arch. Schiffs- u. Tropenhyg.* **36**. 801.], but closely resembles *Eperythrozoon wenyoni* of calves as described by ADLER and ELLENBOGEN [above]. It is considered identical with the latter, except that it belongs to the genus *Bartonella*, and should be described as *Bartonella wenyoni*.

—U. F. RICHARDSON.

KROÓ, H., & ORBANEJA, J. G. (1935). Ueber die ererbte Immunität bei der Hühnerspirochätose. [**Inherited Immunity of Fowl Spirochaetosis**].—*Z. ImmunForsch.* **86**. 224-228. 2 tables. [2 refs.] [Also appeared in *Act. dermo-sifilogr., Madr.* **28**. 235-238].

KROÓ, H., & ORBANEJA, J. G. (1935). Notiz über die Persistenz von Hühnerspirochäten im Gehirn. [**Persistence of Fowl Spirochaetes in the Brain**].—*Ibid.* 229-232. 2 tables. [8 refs.] [Also appeared in *Act. dermo-sifilogr., Madr.* **28**. 239-241].

Both the white and the yolk of eggs laid by fowls which had been infected experimentally with spirochaetes were able to destroy the infectivity of comparatively large numbers of spirochaetes. The blood serum from chicks newly hatched from similar eggs also showed a similar capacity for inactivating these organisms, whilst immune birds actually inoculated intracerebrally with spirochaetes were able to resist infection. These facts indicate that a strong heritable immunity can

be built up. On the other hand, infected chicks treated with neosalvarsan and apparently cured still harboured spirochaetes in the brain.—E. J. PULLINGER.

HUNGERFORD, T. G., & HART, L. (1937). **Fowl Tick Fever. (Spirochaetosis). Also Transmitted by Common Red Mite.**—*Agric. Gaz. N.S.W.* **48**. 591-592. 1 fig.

Until recently it was considered that all outbreaks of fowl spirochaetosis in New South Wales were due to transmission of the causal organism *Treponema anserinum* by the tick *Argas persicus*. The authors present evidence that in several outbreaks the common red mite, *Dermanyssus avium*, acted as vector, no trace of ticks being found on infected premises. Laboratory tests, using healthy and infected birds, also showed that the red mite could transmit the disease.—T. S. G.

ANON. (1938). **Spirochaetosis or Tick Fever of Poultry.**—*J. Dep. Agric. Vict.* **36**. 339-342.

This is a general discussion of the life-cycles, pathogenic effects and control of *Argas persicus* and *Dermanyssus gallinae*. The epidemiology, symptoms and control of spirochaetosis are briefly outlined.—H. McL. GORDON.

I. PETERSEN, C. B., & JACOBSEN, E. (1937). Un cas de spirochétose ictéro-hémorragique (maladie de Weil) vraisemblablement transmis par un chien. [A Case of Weil's Disease in Man Presumably Transmitted by a Dog].—*C. R. Soc. Biol. Paris.* **126**. 797-798. [8 refs.]

II. PETERSEN, C. B., & JACOBSEN, E. (1937). Recherche sur la diffusion de la leptospirose des chiens dans un village danois. [Weil's Disease in Dogs in a Danish Village].—*Ibid.* 799-800. [2 refs.]

I. A case of Weil's disease in a tinsmith of 18 years of age is briefly described. The patient's blood serum reacted in a dilution of 1:300 with *L. icterohaemorrhagiae* on the eighth day of illness, and in a dilution of 1:30,000 on the 30th day. Leptospira could not be demonstrated in the urine. The patient had fondled a dog that had been ill a month previously, and the dog's serum reacted in high dilution with the specific organisms, which were demonstrated in the urine.

II. The authors examined the sera of 53 dogs in the village where the above case occurred. As a result of serological tests done, there was evidence in one-third of the dogs of present or past infection, and further latent cases were diagnosed in the following year. In many of the dogs infection was unaccompanied by symptoms, and in only one dog were typical icteric symptoms noticed. The only dog in which leptospira were demonstrable in the urine was that described in I [above], and on autopsy an interstitial nephritis was found.—D. L. HUGHES.

## DISEASES CAUSED BY VIRUSES

ZAKRZEWSKI, A. (1938). Polska w obliczu nowej inwazji pryszczycy. [The Danger of Foot and Mouth Disease in Poland].—*Przegl. wet.* **53**. 81-90. [German summary.]

Considering the necessary control measures to be taken, with special reference to Polish conditions, Z. recommends an increase in the number of railway centres suitable for disinfecting railway wagons.—V. CHLÁDEK (PRAGUE).

CARPANO, M. (1939). Sulla comparsa della febbre aftosa in Albania. [Foot and Mouth Disease in Albania].—*Azione vet.* **8**. 122-125. [2 refs.]

Previously Albania was free from F. & M. disease for ten years [presumably

means the last ten], but at present the disease is spreading in Yugoslavia and reaching Albania, and all animals have accordingly been withdrawn a few kilometres from the frontier.

The disease has spread from three centres in Albania: in one, 88 animals (affected animals plus in-contacts) were slaughtered, while the two other centres were dealt with by isolation.

C. describes the methods of infection, and the means of spread in Albania.

KULCZYCKI, L. (1939). Refleksje na temat przebiegu i zwalczania pryszczycy. [**Foot and Mouth Disease**].—*Przegl. wet.* **54**. 15-29. [Numerous refs.]

A general review of F. & M. disease is given. The article contains no new information.

BRIDRÉ, BARDACH, & JOLTRAIN. (1938). A propos d'un cas de contagion présumée de stomatite aphteuse de l'animal à l'homme. [**Suspected Transmission of Foot and Mouth Disease from Animals to Man**].—*Rev. Path. comp.* **38**. 1099-1101.

The authors describe a case of suspected F. & M. disease in a young man who spent a holiday on a farm where the disease was rife and drank milk from infected cows. However, his serum 20 days after the illness began was found to have no protective power for g. pigs infected with F. & M. disease virus; consequently the authors consider that the stomatitis was not due to infection with F. & M. disease.

NAKAMURA, J., WAGATUMA, S., & FUKUSHO, K. (1938). **On the Experimental Infection with Rinderpest Virus in the Rabbit. I. Some Fundamental Experiments.**—*J. Jap. Soc. vet. Sci.* **17**. 185-204 of pt. 1. 4 figs., 7 tables. [6 refs.] [In Japanese: abst. from English summary pp. 25-30 of pt. 2].

The authors claim that serial passage from rabbit to rabbit of rinderpest virus originating from virulent calf blood has always been successful in their experiments, since the blood from these rabbits was always infective to susceptible calves. No rabbits died of pure infection with rinderpest virus, and the only symptom observed was a temperature reaction, which only became evident after several passages from rabbit to rabbit. After the 166th passage in rabbits the strain remained virulent for calves. Calves immunized in this way remained resistant to virus of bovine origin. Rabbits once infected with rinderpest virus, whether it was of cattle or rabbit strain, and whether or not a thermal reaction occurred, acquired an immunity which enabled them to resist subsequent inoculation with highly virulent rabbit virus without showing any sign of infection. [See also EDWARDS, J. T. (1925). *Rep. Imp. Bact. Lab., Muktesar, 1923-24*, who reported similar experiments].—J. A. GRIFFITHS.

KUNERT, H. (1938). Züchtung des Rinderpestvirus auf der Chorion-Allantois des Hühnerembryo. [**Culture of the Virus of Rinderpest on the Chorion-Allantoic Membrane of the Chick Embryo**].—*Dtsch. tierärztl. Wschr.* **46**. 487-490. 2 figs. [10 refs.] [See also *V. B.* **9**. 192].

A careful account of experiments carried out in Tanganyika Territory, partly at the Mpwapwa laboratory and partly in Dar-es-Salaam. Eggs were usually inoculated at the eighth day of incubation, and incubated for 5-7 days more before being opened for examination of the membranes. Membranes were examined in sterile saline in a petri dish over a dark background, and were then

shaken up with saline and glass beads to form the suspension to be used for inoculation of a further batch of eggs. Material from several passages was then tested for virulence by inoculation of susceptible calves. K. describes distinct oedematous swelling, and sometimes haemorrhages and necrotic foci in the membrane, following inoculation with rinderpest virus, and these changes, with slight variations, could be reproduced through eight passages. Material from the first passage, stored in saline and glycerin at 0°C. for two months, still produced these changes on inoculation into eggs. Smears of affected membranes from first passage eggs, stained by Paschen's method, showed in some instances a picture very similar to that of the elementary bodies of variola vaccine. This picture was never observed in later passages or in membranes from uninoculated eggs.

Interpretation of reactions following inoculations of calves was complicated by local conditions. The possibility of previous infection of the ten calves used could not be overlooked, and two cases of immediate febrile reaction following inoculation might actually have been due to infection accidentally introduced from nearby foci of the natural disease. One case was complicated by coincident trypanosomiasis. However, the results were considered to be suggestive, and to warrant further investigation. The virus was shown to remain infective on the chorio-allantois for five days, but K. was unable to conclude with certainty that there was transmission of the virus through a series of eggs, or that there was actual multiplication of the virus.—H. E. HARBOUR.

LE ROUX, G., & TRAN-NGOC-HOAN. (1939). Étude de la valeur immunigène des amygdales des vœaux atteints de peste bovine expérimentale. [Immunizing Value of the Tonsils of Calves with Experimental Rinderpest].—*Bull. Soc. Path. exot.* 32. 182-187. [4 refs.]

Lymph nodes and the tonsils of three calves were removed five days after the animals had been infected with rinderpest. Two vaccines were prepared, one from the lymph nodes and the other from tonsils. Three weeks later four calves were injected subcutaneously with the lymph node vaccine and four with the tonsil vaccine, in small doses, and 15 days later each received 2 c.c. of citrated virulent blood. The animals injected with tonsil material showed much less severe reactions than did those injected with the lymph node material. From this and further experiments, the authors conclude that the tonsils of calves infected with rinderpest have a marked immunogenic value, which is one and a half to three times greater than that of the lymph nodes.

NAIK, R. N. (1988). Duration of Immunity Following Goat-Virus Vaccination in Cattle.—*Indian J. vet. Sci.* 8. 103-112. 6 figs., 1 table.

Out of 82 animals inoculated in 1982 with rinderpest goat virus in India, four (a bullock aged nine and a half years, a cow aged ten years eight months, a buffalo cow aged eight and a half years, and a buffalo cow aged ten years) were tested for their immunity to bovine virus in 1987. In all of them the reaction to goat virus had been fever, dullness and congested mucous membranes, one having also diarrhoea. The bovine virus used in the test of immunity had been obtained four days previously from bulls at Muktesar, and was given in 2 c.c. doses. One bull, two years old and another three and a half years old, used as controls, gave temperature reactions with suspended rumination and "soft faeces" for a few days; a secondary temperature reaction followed, and *Babesia bigemina* were demonstrated in the blood of one and *Theileria mutans* in that of the other. The four animals originally tested gave no reactions.—J. A. GRIFFITHS.

JUGE. (1938). Vaccination contre la peste bovine. [**Vaccination against Rinderpest**].—*Bull. Acad. vét. Fr.* **11**. 351-353.

J's conclusions are drawn from large-scale vaccinations in Annam. The use of tissue pulp from affected animals, *i.e.*, lymph node, spleen, and lung tissue, treated with toluene, chloroform or formol, has displaced that of the serum-virulent blood and serum-alone methods. J. states that the tissue vaccine is killed, not attenuated, and causes no systemic symptoms. Immunity takes 10-15 days to establish, and lasts less than five months. Killed virulent blood does not produce an immunity. J. states that conferring a permanent immunity by a second injection of virulent material has the same risks as serum-virus injections, and does not always result in a permanent immunity.—S. F. BARNETT.

- I. CAMPBELL, A. D. (1938). **A Preliminary Note on the Experimental Reproduction of [Contagious] Bovine Pleuro-Pneumonia.**—*J. Coun. sci. industr. Res. Aust.* **11**. 103-111. 1 fig. [8 refs.]
- II. CAMPBELL, A. D. (1938). **Contagious Bovine Pleuro-Pneumonia : A Report on the Use of New Antigens for the Complement-Fixation and Agglutination Tests.**—*Ibid.* 112-118. 1 fig., 1 table. [11 refs.]
- III. CAMPBELL, A. D. (1938). **Contagious Bovine Pleuro-Pneumonia : A Preliminary Note on Immunity.**—*Ibid.* 119-126. 2 figs., 3 tables. [7 refs.]

I. The study of the incubation period in this disease, and of the value of methods of immunization, has been handicapped in the past by the lack of a method for experimentally reproducing the clinical picture of the disease in susceptible cattle. C. describes two methods which he found effective. In the first, 600 c.c. of fluid culture are atomized by means of a commercial paint-spray gun in an enclosed loose-box containing the susceptible animals, and infection takes place by inhalation. Of 80 animals so treated, 41% developed clinical pleuro-pneumonia, 52% a milder type of disease (only detected in the living animals by positive c.-f. tests), and 7% proved refractory. Examination of these animals after death from the disease or after slaughter revealed conclusive evidence of specific thoracic infection in 92.5%. In the second method, the disease was reproduced in all of six cattle by introducing fluid infective material into the small bronchi by means of a long rubber catheter the animals being cast and kept under restraint. The infectivity of artificially produced cases, and the incubation period are discussed.

II. C. describes a new culture-antigen which he found most satisfactory for use in the c.-f. test. It replaces the original Ebert and Peretz type of antigen prepared from pleuritic fluid, which was formerly recommended by CAMPBELL and TURNER [*V. B.* **7**. 111]. The new antigen is easier to prepare, is more constant in its properties and has a higher antigenic value and sensitivity. The preparation of a new antigen for the aggl. test is also described. Using these antigens C. found that, after exposure of cattle to atomized culture [see I, above], c.-f. antibodies were first detected between the 6th and 10th days, and agglutinins between the 9th and 12th. Following the onset of clinical symptoms, agglutinins rapidly decreased, whereas c.-f. bodies became stronger, occurring sometimes with dilutions of serum as high as 1:20,480. He concludes that the c.-f. test is an excellent method for the diagnosis of this disease and for the detection of carriers, but that the aggl. test is relatively valueless.

III. The technique described by C. for reproducing the disease experimentally [see I, above] enabled him to study the resistance to infection induced by vaccination. Resistance tests following inoculation with cultures of living organisms indicated that in order to produce a satisfactory immunity lasting 12 months or more, it was necessary to use a strain of the organism possessing a

relatively high degree of virulence. Single inoculation with such organisms provided as strong an immunity as did double inoculation. Of 51,000 head of cattle inoculated in the field with a vaccine prepared from such organisms, 1.03% developed "bad tails", and the mortality rate was 0.18%. Such ill-effects are negligible when compared with the protection afforded.—T. S. GREGORY.

SEDDON, H. R. (1938). **The Spread of Ephemeral Fever (Three-Day Sickness) in Australia in 1936-37.**—*Aust. vet. j.* **14**. 90-101. 3 maps. [2 refs.] Discussion pp. 101-105.

S. discusses the means by which this disease may have been introduced into Australia, suggesting that it may have come from the islands to the north as the result of the accidental introduction of insect vectors in boats trading with Australia. There was no evidence to indicate that it appeared at Darwin or near other aerodromes in the north. The spread of the disease along the north of Australia in 1936, and along the east coast as far south as Victoria in 1936-37, appeared to be linked with rainfall adequate for the breeding of insect vectors, the presence of active cases as the source of infection, and the direction of the prevailing winds. He suggests that the insect vector was probably wind-driven by the prevailing winds, with the result that the disease spread with great rapidity and, moreover, was able to cross wide areas containing few or no cattle. The lessened incidence and gradual disappearance of ephemeral fever in southern Australia also indicated that climatic influences determined its limitation.—T. S. GREGORY.

- I. HOWITT, Beatrice F. (1938). **The Moscow 2 Strain of Equine Encephalomyelitic Virus as Compared with Other Strains of Equine Encephalitic Viruses.**—*j. infect. Dis.* **63**. 269-286. 5 charts, 4 tables. [Numerous refs.]
- II. FINKELSTEIN, H., MARX, W., BRIDGERS, W. H., & BEARD, J. W. (1938). **Rate of Inactivation of Equine Encephalomyelitis Virus (Eastern Strain) Relative to H ion Concentration.**—*Proc. Soc. exp. Biol., N.Y.* **39**. 103-105. 1 fig. [7 refs.]

I. From the material presented, it may be assumed that the American strains of E.E. virus have a common antigenic component which may be enhanced by hyperimmunization, thus bringing out a group factor which is more noticeable in the complement-fixation test and in cross-immunity tests than in neutralization tests. Moscow 2 type of virus may at present be considered a distinct variety of these viruses, and related to other types only by its ability to produce a similar form of disease of the central nervous system in similar hosts. In most other respects it is quite distinct from the American varieties. There are differences in incubation periods, temperature curves, and clinical behaviour in g. pigs. All three strains infect the horse and the same types of experimental animals. The eastern American variety may easily infect animals when injected intradermally in minute doses, but the others are less certain to take effect in high dilutions. Moscow 2 type is more infective when given through the C.N.S. than when given by other routes, except in large doses. Virus is recoverable from the blood serum and tissues in animals infected with the American viruses; the Moscow 2 virus, however, is only recoverable from the C.N.S. and occasionally from the salivary glands.

The Russian workers found certain cross-reactions between the Moscow 2 virus and rabies virus. It resists freezing, and also resists heating for ten minutes at 70°C. It cannot be cultivated *in vitro* or on the chorio-allantoic membrane of the developing chick; it does not confer immunity on young g. pigs born of immune parents, and it is serologically and immunologically distinct from the

American strains, as shown by the c.-f. and neutralization tests and by cross-inoculation of immune animals. Brain tissue also contains certain intracytoplasmic inclusions peculiar to this form.

II. Detailed studies of pH stability and range of infectivity of plant and certain animal viruses have shown that there is a well-defined pH range where infectivity is relatively stable for a given virus.

The Eastern strain of E.E. virus seems to differ in this respect: extracts of this virus in infected embryo tissue were mixed with composite buffer solution of various degrees of pH. Mixtures tested after one hour gave similar results to other viruses studied, but tests after one week showed a maximum stability of infectivity between pH 7.5 and pH 8.5, while maximum inactivation of virus occurred between pH 5.1 and pH 5.7: there was a similar curve in tests after one day. The possibility of an enzyme-like substance in chick embryo tissue causing inactivation of virus is suggested, since with a purified virus free of chick embryo tissue, the region of rapid inactivation between pH 5.0 and pH 6.5 is not apparent.—J. A. GRIFFITHS.

I. COX, H. R., PHILIP, C. B., MARSH, H., & KILPATRICK, J. W. (1938). **Observations Incident to an Outbreak of Equine Encephalomyelitis in the Bitterroot Valley of Western Montana.**—*J. Amer. vet. med. Ass.* **93**. 225-232. 4 figs., 3 tables. [12 refs.]

II. EICHORN, A., & WYCKOFF, R. W. G. (1938). **Immunological Studies on Equine Encephalomyelitis.**—*Ibid.* 285-290. 2 tables. [7 refs.]

I. Two strains of virus were recovered and identified as of the Western type. Fifty-seven cases occurred among 485 horses, with 20 deaths; only two of the latter had had prophylactic serum treatment, and those only 3-4 days before the outbreak. A month after the disease had died down there was a fresh outbreak of acute disease of horses in the same area. 36 horses sickened and 31 died; 28 of these had been vaccinated during the first outbreak. The cause of the illness was not ascertained, but the symptoms and P.M. appearances resembled the "acute liver atrophy" of equines described by THEILER [(1919). *5th and 6th Rep. Vet. Res. S. Africa.* p. 9.] in connexion with immunization of horses against African horse-sickness.

II. This paper reviews the methods of immunization and emphasizes the advantages of the chick embryo tissue vaccine as compared with horse brain vaccine. Chick embryo tissues have proved the most suitable media for the growth of E.E. virus, for when the tissues are fully diseased the virus concentration is 100,000 times more than in infected horse brain. The formalinized chick embryo virus is also more effective for immunization; it protects against intracerebral inoculation of many fatal doses of virus. Chick vaccine is of such high potency that it can be standardized for protective value prior to use. It thus provides an effective means of control of the disease.—J. A. GRIFFITHS.

ANON. (1938). **Equine Encephalomyelitis Virus Fatal to Children.**—*Vet. Med.* **33**. 544.

Over 20 cases of sleeping sickness in children among whom there was more than 50% mortality were found to be due to the Eastern type of E.E. virus. All the evidence indicated mosquito transmission, for none of the children had been in contact with affected equines. The equine disease was however prevalent.

—J. A. GRIFFITHS.

HAMMERSLAND, H. L., HERRIN, H. S., & HAYNES, C. F. (1938). **A Study of the Blood in Horses Infected with Infectious Anemia.**—*J. Amer. vet. med. Ass.* **93**. 320-324. 2 figs., 2 tables. [4 refs.]

Blood sedimentation in horses is more rapid in disease than in health, but this test is not diagnostic of any one disease; sedimentation rates in sick horses are said to remain high after all symptoms of the disease have subsided.

Tests with blood of 60 normal horses and 40 horses clinically recovered from equine infectious anaemia gave average readings of 18 and 26 respectively, and the authors consider the test of value in diagnosis.

Chemical tests showed a slight increase in Ca and a decrease in Fe in the blood of horses with E.I.A., and bile was also present in 39.3% of the blood samples examined. Blood examination results are recorded in a table.—J. A. GRIFFITHS.

HUPBAUER, A., & LUGOMER, V. (1938). Je li enzootska bronhopneumonija sisajuće zdrebadi virusno oboljenje? [**The Possibility that Enzootic Broncho-Pneumonia of Foals is a Virus Disease**].—*Vet. Arhiv.* **8**. 468-470. [3 refs.] [German summary]. [See also *V. B.* **9**. 171].

The authors were able to produce broncho-pneumonia in young foals following intranasal administration of a cotton-filtrate obtained from an emulsion of the lungs of foals which had died from the disease. Both clinical and P.M. findings were identical with those observed in natural cases. When a Seitz filtrate was used, mild illness developed, but no macroscopical lesions were observed P.M. The authors are of the opinion that the above disease is caused by a pneumotropic filtrable virus.—B. OSWALD (KRIŽEVCI).

BALOZET, L. (1938). Contribution à l'étude expérimentale de la heart-water. [**Research on Heartwater**].—*Bull. Acad. vét. Fr.* **11**. 319-323.

The present article is a recapitulation and amplification of a former work by B. [see *V. B.* **6**. 809]. Heartwater virus passaged through rats is quickly attenuated and lost, but the febrile reaction evoked in rabbits occurs up to the seventh passage. Sheep which reacted to inoculation with virus passaged through laboratory animals remained susceptible to sheep-passaged virus. Serum taken at various intervals after inoculation with heartwater virus did not agglutinate *Proteus* 1, OX 19, OX 2, or OX K (Weil-Felix reaction). G. pigs and rats infected with heartwater virus remained susceptible to typhus and, after infection with the latter, gave a positive Weil-Felix reaction, using *Proteus* OX 19.

—H. E. HARBOUR.

DAYUS, C. V. (1939). "Scabby Mouth" and "Pink Eye" in Sheep. **Methods of Treatment Described.**—*N.Z. J. Agric.* **58**. 215-217.

A popular article for farmers. In New Zealand the mortality from contagious ecthyma is negligible, but affected sheep may suffer a severe setback and lose condition rapidly. A vaccine prepared at the Wallaceville Veterinary Laboratory has been very successfully used to prevent the development of the disease.

—L. W. N. FITCH.

PENNACCHI, L. (1936). Sulla recettività dell'epitelioma contagioso dei polli (pecora e cavallo). [**Attempts to Transmit Fowl Pox to a Horse and a Sheep**].—*Clin. vet., Milano.* **59**. 165-169. 3 figs. on 1 plate.

Material from crusts on infected fowls which produced infection in fowls within 37 hours was injected into the thickness of the cornea of a horse and a sheep, care being taken to avoid the injection of inoculum into the aqueous humour.

After a few hours there was intense lachrymation, accompanied by photophobia and a slight inflammation of the conjunctiva. Two days later, the cornea of the sheep was completely opaque and that of the horse showed a few opaque spots. Four days after injection the lachrymation and photophobia had diminished, but the eye of the sheep was still opaque, while in the horse the patches had increased so that the cornea was completely white. On the 12th day the eye of each animal was removed and a histological examination made. Inflammatory lesions were found in the outer layer of the horse's cornea, the inner layers remaining normal. The sheep's eye was practically normal, apart from a slight cellular infiltration.

- I. TANG, F. F., & WEI, H. (1937). **Morphological Studies on Vaccinia Virus Cultivated in the Developing Egg.**—*J. Path. Bact.* **45**. 317-323. 10 figs. on 2 plates, 1 table. [15 refs.]
- II. RAO, R. S. (1938). **Cultivation of Sheep-Pox Virus on the Chorio-Allantoic Membrane of the Chick Embryo.**—*Indian J. med. Res.* **26**. 497-504. 4 tables. [7 refs.]

I. Vaccinia virus was cultivated on the chorio-allantoic membrane for 22 generations. The virus became exalted in virulence for the chick embryo and tended to produce a gelatinous oedema in the subcutaneous tissues of rabbits.

Embryos, examined by transmitted light, and also after fixing and staining with Giemsa, showed numerous inclusion bodies. In the early stages large forms were seen, probably corresponding with Guarnieri bodies, but embedded in them were small granules which were thought to be related to Paschen bodies. In one instance a human volunteer vaccinated intradermally with egg membrane virus presented a generalized eruption.

II. Filtered sheep pox virus (gradocol membrane, A.P.S. 0.65 $\mu$ ) was successfully transmitted to the chorio-allantoic membrane, where it produced extensive lesions characterized by hypertrophy of the mesoderm and enormous proliferation and oedema of the ectoderm. Serial passages on the egg were secured [?9].

The initial material was not infective for rabbits or calves, but by the third passage on egg produced confluent eruptions in both species. Some indication was obtained, by cross-immunity experiments and by mixtures of virus with antisera, that the egg virus had some antigenic relationship with vaccinia.

A sheep inoculated with culture virus showed a purely local reaction and was subsequently immune. Further work will be necessary, however, to determine whether this method would be of practical value.—R. E. GLOVER.

STRYSZAK, A. S. (1937). Uwagi nad ochronno-lecznicznymi szczepieniami psów przeciw wściekliznie. [**Preventive Vaccination of Dogs against Rabies**].—*Wiad. weteryn.* **16**. 365-381. [15 refs.] [German summary].

S. describes very satisfactory results obtained with the use of antirabic vaccination by Semple's and the Japanese methods. Out of 75 dogs treated, only two died. The article is mainly concerned with the problem of the large number of stray dogs in Poland which spread rabies, and S. suggests that the government should take more precautions against the infection.

- I. BALOZET, L. (1938). La vaccination antirabique des animaux en Tunisie du 1er janvier au 31 décembre 1937. [**Antirabies Vaccination of Animals in Tunisia in 1937**].—*Arch. Inst. Pasteur Tunis.* **27**. 241-244. 1 table.
- II. REMLINGER, P., & BAILLY, J. (1938). La vaccination antirabique des animaux au Maroc en 1937. [**Antirabies Vaccination of Animals in Morocco**].

in 1937].—*Bull. Acad. vét. Fr.* **11**. 122-130. 3 tables. [Also appeared in *Maroc méd.* **18**. 243-246].

- III. REMLINGER, P. (1938). Les accidents paralytiques du traitement antirabique par la méthode d'Högyes et leur cause. [**Paralysis Following the Use of Högyes' Rabies Vaccine**].—*Maroc méd.* **18**. 123-125. 3 tables. [3 refs.]

- IV. GRIMPRET, G. (1938). Diabète et vaccination anti-rabique chez le chien. [**Diabetes and Antirabic Vaccination in Dogs**].—*Ibid.* 247-248.

I. A table indicates the number of vaccinations with etherized virus carried out in the various districts in Tunis, and the results. None of the 552 vaccinated dogs contracted rabies; in some cases local abscesses were reported at the site of inoculation. Good results were also noted in vaccinated equines and bovines. In the town of Tunis vaccinated dogs are exempt from the municipal tax.

II. Tables are given indicating the numbers of the various animals vaccinated. Phenol vaccine is now preferred to etherized vaccine, as the former is said to keep better. The method of inoculation is described. Owing to the sensitivity of the cat to phenol, the dose at each injection must not be greater than 10 c.c.

No case of rabies occurred in the animals vaccinated, and there were no accidents due to the inoculation. Bad results obtained may be from using only a single inoculation, or from the use of improperly prepared vaccine. Poor quality commercial vaccines have been encountered. Vaccination is justified on general economic grounds, and it is suggested that regular routine vaccination of dogs in certain areas in France should be insisted upon.

III. Statistical evidence indicated that the use of Högyes' diluted brain suspension was more frequently followed by undesirable sequelae due to the vaccine than was the case with the other commonly used vaccines. The necessary dilution cannot accurately be anticipated, in view of the variation in virulence caused by passage from rabbit to rabbit.

IV. Clinical details are given of a dog which developed paresis 48 hours after a rabies vaccination, and diabetes after a second inoculation about a year later. G. considers that these complications were due to the effect of the rabies vaccination on a subject affected with chronic nephritis.—F. H. MANLEY.

REMLINGER, P., & BAILLY, J. (1938). Transmission de la rage au chien par voie vésicale. [**Transmission of Rabies to the Dog by Inoculation into the Bladder**].—*C. R. Soc. Biol. Paris.* **129**. 739-741.

In the three cases described, an exalted virus was introduced into the bladder through a catheter by means of a special syringe, precautions being taken to prevent injury to the urethra.

In each case symptoms of rabies were produced, and death ensued. In one case lesions were observed in the mucous membrane of the bladder but not in the urethra. In the other cases no signs of cystitis or urethritis were observed. It is suggested that the virus might take an upward path and be absorbed in the ureters.—F. H. MANLEY.

BRAGA, A. (1938). Sobre a ocorrência da gastro-enterite infectuosa dos felinos. [**Infectious Gastro-Enteritis of Cats in Brazil**].—*Bol. Soc. brasil. Med. vet.* **8**. 159-170. 2 figs. on 1 plate, 1 table. [19 refs.] [French summary].

This condition is comparatively rare in Brazil and has been introduced by imported cats. Inoculation experiments on wild animals of the cat family yielded negative results. The usual symptoms and course of the disease were similar to those known in Europe.—A. H. HUNTER.

PERDRAU, J. R. (1938). **Recent Research in Acute Poliomyelitis.**—*Lancet*. 235. 905-906. [7 refs.] [See also *V. B.* 9. 244].

Poliomyelitis virus (infantile paralysis) can only be neutralized by immune serum while it is still circulating in the blood stream. Once the virus has reached the cells of the central nervous system, antibodies cannot reach it, because these cells are bathed by cerebrospinal fluid, and under normal conditions serum globulin cannot filter through to this fluid. The only time globulin containing antibody filters through is when there is active inflammation of the C.N.S. as, for instance, when active poliomyelitis infection has taken place and thus after damage has been done. Serum therapy is therefore unsuccessful, and drug therapy also has so far been a failure. In the C.N.S. of adults there is a strong natural resistance to this disease, and a promising line of research would aim at ascertaining how the C.N.S. of the adult and juvenile differ.—E. J. PULLINGER.

TRAVASSOS, J. (1938). La tique *Amblyomma striatum*, Koch 1844 comme vecteur du "typhus exanthématique de Sao Paulo". Infection naturelle en spécimens recueillis sur des chiens, dans un foyer de la capitale (Sao Paulo). [Natural Infection with Exanthematic Typhus in *A.s.* from Dogs in São Paulo].—*C. R. Soc. Biol. Paris*. 127. 1377-1380. [1 ref.]

Adult *A.s.*, recovered from apparently healthy dogs in the environs of São Paulo, were found to be infected with exanthematic typhus virus. The presence of infection was demonstrated both by allowing the ticks to feed on g. pigs and by injecting emulsions of the ticks into g. pigs. G. pigs immune to a passage strain of human exanthematic typhus virus were not susceptible.—J. MACLEOD.

PIJPER, A., & CROCKER, C. G. (1938). **Rickettsioses of South Africa.**—*S. Afr. med. J.* 12. 613-630. 17 figs. [Numerous refs.]

The existence of three rickettsias in man in South Africa has been established, viz, tick bite fever, louse typhus, and murine rat flea, or sporadic, typhus. The relationship of these rickettsias to those of other countries has been insufficiently studied. Tick bite fever should be regarded as rickettsiasis *sui generis*, and is always associated with a primary sore from tick bite. Three species of ticks have been incriminated as carriers of the infection. The authors contend that South African epidemic typhus is not identical with the classical typhus. In sporadic typhus a virus was found which was identical with one obtained from rats. It cannot be maintained in g. pigs indefinitely, as it has a tendency to die out. G. pigs immune to it were also immune to tick bite fever, but not to epidemic typhus.

—E. M. ROBINSON.

I. BURNET, F. M. (1938). **Tissue Culture of the Rickettsia of Q. Fever.**—*Aust. J. exp. Biol. med. Sci.* 16. 219-224. 4 figs., 1 table. [10 refs.]

II. DERRICK, E. H., JOHNSON, D. W., SMITH, D. J. W., & BROWN, H. E. (1938). **The Susceptibility of the Dog to Q Fever.**—*Ibid.* 245-248. 2 figs., 1 table. [5 refs.]

I. In previous papers [*V. B.* 9. 163.] B. and his fellow workers have described the causal organism of Q fever (a mild fever affecting man) as a rickettsia, but some authorities have subsequently expressed doubt regarding the justification for such a classification. He reports the successful cultivation of the organism in Maitland type tissue cultures and emphasizes the fact that growth occurs principally during the second week of cultivation. In this respect it is similar to the typhus rickettsia and differs strongly from viruses, nearly all of which produce a maximal titre in 48-72 hours. B. states that there is strong circumstantial evidence

that the micro-organism of Q fever is derived from an animal reservoir consisting of small native marsupials, and that it is transmitted by an arthropod. In several laboratory infections it seemed likely that the mite *Liponyssus bacoti* was responsible for transmitting the infection from experimental mice to human beings.

II. The authors have shown that fever may be produced in dogs by inoculation of emulsions of liver from g. pigs artificially infected with the rickettsia of Q fever. One experimental dog had definite fever for three days and the organism was recovered (by g. pig inoculation) from as little as 0.001 g. of its spleen. As human beings affected with Q fever have not had special association with dogs, and because of the localized distribution of the disease, it seems most unlikely that dogs and their ectoparasites play any important part in natural transmission. It is of interest to note that it has been reported from other countries that dogs are susceptible to infection with the rickettsia of epidemic and endemic typhus, boutonneuse fever and Rocky Mountain spotted fever. Dogs in Algeria and France suffer from a serious and often fatal disease due to *R. canis* which is transmitted by the tick *R. sanguineus*, a parasite common in Queensland, but the work by the authors indicates that Q fever is a different disease.—T. S. GREGORY.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

VAZ, Z. (1935). *Cochliomyia hominivorax* agente causal de miiases em animaes domesticos do Brasil. (Caractères que permitem distingui-la de *C. macellaria*). [*C.h.* in Cases of Myiasis in Brazil, and its Differentiation from *C. macellaria*].—*Rev. Biol. Hyg., S. Paulo.* 6. 13-18. 8 figs. [Numerous refs.] [English summary].

*Cochliomyia* larvae taken from cases of myiasis in a pig, a dog and cattle were bred, and the adults were identified as *C.h.* V. gives a list of characteristics that will help in distinguishing *C.h.* and *C.m.*

OBITZ, K. (1937). Giez bydlęcy w Polsce, jego rozmieszczenie i zwalczanie. [*Ox Warbles in Poland, their Distribution and Control*].—*Paras. Inst. nauk. gosp. Wiejsk. Pulawy.* 1. 100-106. 1 map. [8 refs.] [English summary]. Suppl. to *Wiad. weteryn.* 16.

O. describes the incidence of ox warbles in Poland (30-70%), giving tables for the various parts of the country and names of proprietary remedies used.

LOPES, H. de S. (1938). Sur une fausse myiase des poules produite par la larve de la *Lucilia eximia* Wied. (Dipt.—Calliphoridae). [*A False Fowl Myiasis Caused by Larvae of L.e.*].—*C. R. Soc. Biol. Paris.* 129. 426.

Two larvae of the fly *L.e.* were found on the legs of a chicken severely infested with the sarcoptic mite *Cnemidocoptes mutans*. The larvae are believed to have been feeding only on the epithelial detritus resulting from the infestation with mites, and to be of no pathogenic significance.—J. MACLEOD.

DORMAN, S. C., HALE, W. C., & HOSKINS, W. M. (1938). *The Laboratory Rearing of Flesh Flies and the Relations between Temperature, Diet, and Egg Production*.—*J. econ. Ent.* 31. 44-51. 1 fig. [Numerous refs.]

The authors describe a technique for laboratory rearing of *Lucilia sericata* in large numbers on fish heads. The life-cycle occupied just under four weeks at 25°C., under three weeks at 30°C., and over five weeks at 20°C. For interruption of the life-cycle by low temperature, the prepupal stage was found to be most

suitable, eggs and pupae being adversely affected by exposures for a few days only to temperature below the threshold of development.—J. MACLEOD.

- I. DANELIUS, G., & LÖFSTEDT, F. (1938). Behandling av inälvparasiter hos häst. [**Treatment of Gastro-Intestinal Parasites in Horses**].—*Svensk VetTidskr.* **43**. 153-159. [5 refs.]
- II. PETTERSSON, B. (1938). Om gastrophiluslarver hos häst. [**Gastrophilus Larvae in Horses**].—*Ibid.* 160-162.

I. Emphasis is laid on the importance of intestinal parasites in relation to horse-raising in Sweden. In addition to prophylactic measures for horse bots, the carbon bisulphide treatment on a large scale was adopted, with good results, in the Linköping district of Sweden, 1,244 horses being treated between November, 1936 and March, 1937.

II. P. discusses the disorders which *Gastrophilus* larvae may cause in the horse. A short summary of the main clinical symptoms and pathological changes is given.—GUSTAV NAERLAND (OSLO).

NASH, T. A. M. (1937). **Advice on Tsetse Surveys and Clearings**. pp. 9. Kaduna : Govt. Printer. [8vo].

This paper gives advice on the method of breaking down man-fly contact, to render tsetse harmless to man, and thus reduce the spread of human trypanosomiasis.

"Aggressive clearings", made by dealing with dry season fly sanctuaries, need expert judgment. In "defensive clearings", the population is protected while at work by keeping the fly at a safe distance. Clearings 440 yds wide are necessary for *Glossina palpalis* and 200-300 yds wide for *G. tachinoides*. In *G. morsitans* areas it is better to remove the population when practicable. Clearing must be ruthlessly carried out and the remaining vegetation burnt when dry. The clearings must also be carefully maintained.—J. A. GRIFFITHS.

TOBBACK, L. (1938). Les tiques et les moyens de les combattre. [**Ticks and Methods for their Control**].—*Propagande et Vulgarisation agricoles*. Tract No. 12. pp. 92. 3 figs., 2 tables, 1 diagram. [1 ref.] Bruxelles : Imprimerie Industrielle et Financière, S.A. [8vo] [Fr. 1].

A popular survey, for the Belgian colonies, of the principal ticks of economic importance to agriculture as vectors of disease. Control methods recommended are :—(1) burning the pastures at the end of the dry season ; (2) starving the ticks by a system of rotational grazing, each grazed section being cultivated immediately afterwards, and (3) dipping stock in arsenical washes. Dipping is recommended as a principal measure, along with which either of the other two measures may be employed. The constitution, preparation and use of arsenical dips are discussed, and details are given of the construction of dipping tanks and accessory equipment.

—J. MACLEOD.

SHARIF, M. (1938). **Diseases Transmitted by the Indian Species of Ticks and the Possibility of their Prevention through Biological Control**.—*Indian J. vet. Sci.* **8**. 853-866. 3 appendixes. [Numerous refs.]

The tick fauna of India is represented by 11 genera and about 70 species. Ticks are found on most animals, including mammals, birds, snakes, lizards, tortoises, and also man. The most important tick species in India, together with the diseases with which they are associated, are :—*Argas persicus*, vector of the fowl spirochaete ; *Haemaphysalis bispinosa*, suspected vector of *Babesia motasi* ;

*Rhipicephalus sanguineus*, vector of *Babesia canis* and suspected vector of tick typhus fever and *Babesia gibsoni*; *Rh. haemaphysaloides* and *Dermacentor auratus*, suspected vectors of tick typhus fever; *Boophilus australis*, vector of *Theileria mutans*, and *Hyalomma (Hyalomma) aegyptium*, vector of *Babesia bigemina*, equine piroplasmiasis due to *Babesia caballi* and *Babesia equi*, and *Th. mutans*. A list is given of 26 other species which have been found on domestic animals in India, but they are considered to be of comparatively little importance. Suggested control measures include biological control by means of *Hunterellus hookeri*.—W. MOORE.

FARQUHARSON, J., & BLY, H. (1939). **Tick Paralysis in Colorado.**—*N. Amer. Vet.* **20**. No. 2. 51-53. [9 refs.]

A note on tick paralysis caused by *Dermacentor andersoni*.—W. MOORE.

MACINDOE, R. H. F. (1938). **The Poultry Stickfast Flea (*Echidnophaga Callinaeae*).**—*J. Dep. Agric. S. Aust.* **41**. 732-735.

This flea has been scheduled under the provisions of the local Stock and Poultry Diseases Act. It has been found on poultry, pigeons, dogs and cats. M. discusses ways in which the flea is retained on infested premises, life-history, symptoms of infestation, and measures for control and eradication.—H. McL. G.

CAMERON, D. (1938). **The Northern Fowl Mite (*Liponyssus sylviarum* C. & F., 1877). Investigations at Macdonald College, Que., with a Summary of Previous Work.**—*Canad. J. Res. Sect. D.* **16**. 230-254. 1 fig., 2 tables. [Numerous refs.]

C. reviews the literature on the northern fowl mite (*L.s.*). Twenty bird hosts and two mammals (man and the lemming) are recorded, and the morphology and bionomics of the mite are discussed in detail. He recommends the isolation of infested birds, the clearing of roosts, floor-boards and boxes in frosty weather, and the painting of roosts and their supports, and the lower front edges of nest boxes, with nicotine sulphate 20 minutes before the bird roosts (a single treatment). The birds come in contact with the nicotine and so rid themselves of mites; 2 oz. is sufficient for 50 birds, but all should be treated on the same evening. Single birds may be hand-treated. New birds should be quarantined.—T. W. M. C.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

LUKASIAK, J. (1937). **Robaki pasożytnicze u kotów w Warszawie i jej okolicach. [Helminths of Cats in and around Warsaw].**—*Wiad. weteryn.* **16**. 321-342. 8 figs., 4 tables. [Numerous refs.] [French summary].

L. examined 65 cats from Warsaw and district and found 58 infested with helminth parasites viz:—the trematodes, *Opisthorchis felineus*, *Echinocasmus perfoliatus*, and *Alaria alata*; the cestodes *Diphyllbothrium latum*, *Mesocostoides lineatus*, *Dipylidium caninum*, and *Taenia taeniaeformis*, and the nematodes *Toxocara canis*, *T. mystax*, *Toxascaris leonina*, *Aleurostrongylus abstrusus*, *Ancylostoma caninum*, *Uncinaria stenocephala*, *Ollulanus tricuspis*, *Capillaria aerophila* and *Capillaria felis-cati*. He states that this is the first time that *Ollulanus tricuspis* and *Aleurostrongylus abstrusus* have been reported in Poland as parasites of cats.

- I. SWALES, W. E. (1936). **Some Aspects of the Sheep Parasite Problem in Quebec.**—*J. Agric., Quebec.* **40**. 33.
- II. SWALES, W. E. (1938). **The Policy Concerning the Control of Stomach Worms of Sheep in Eastern Canada.**—*Canad. J. comp. Med.* **2**. 289-292.

I. The author refers briefly to the stomach worm problem in Quebec,

describing and illustrating his drenching bottle for sheep and lambs. He discusses the nodular worm problem in more detail, and comments on the treatment of tapeworm infections.

II. The author notes that *Haemonchus contortus* and *Oesophagostomum columbianum* are the two most important nematodes of sheep in eastern Canada. He recommends a bluestone nicotine sulphate treatment for the former, and describes a dosing apparatus designed by himself, giving full details for dosing; no previous fasting is necessary. He states that a successful treatment for nodular disease is not yet available.—T. W. M. CAMERON.

EVANS, S. A. (1938). **Some Notes on Bovine Fascioliasis.**—*Rep. Dep. vet. Sci. Tanganyika, 1937.* pp. 26-27.

For the examination of faeces for liver fluke eggs the sedimentation method is regarded as better than the flotation method. Examination of specimens collected on three consecutive days was considered necessary before a negative diagnosis could be given. Carbon tetrachloride in 5 c.c. doses freshly mixed with skim milk might be considered to be a safe and fairly effective dose for the average adult zebu ox.

Living flukes were found in the liver of an ox seven years after its arrival at the laboratory farm (which is fluke-free); prior to this record three years was the longest period that flukes had been known to survive.

MAROTEL, & GRATECOS. (1938). Apparition soudaine, en France, d'une parasitose exotique: l' "Amphistomose bovine". Urgence de l'enrayer. [**Sudden Appearance of Bovine Amphistomiasis in France**].—*Bull. Acad. Méd. Paris.* 119. 408-410. [Also appeared in *Rev. Méd. vét., Toulouse.* 90. 398-401].

The authors describe a disease which broke out among cattle in Meurthe-et-Moselle, clinically resembling hepatic distomatosis. Examination of the stomach, rumen and reticulum, however, revealed large numbers of worms identified as *Paramphistomum cotylophorum*. It is pointed out that this worm has hitherto only been found in Africa, Asia and America. The authors urge drastic measures to prevent a spread of this outbreak, which would appear to have originated with infected slaughter animals (e.g., sheep) imported from Africa, by administration of worm treatment to all infested animals and the destruction of the intermediate hosts of the parasite (the *Bulinus* snail).

CANNON, D. G. (1938). **Some Trematode Parasites of Ducks and Geese in Eastern Canada.**—*Canad. J. Res. Sect. D.* 16. 268-280. 9 figs., 1 table. [8 refs.]

C. describes and illustrates trematode parasites from ducks and geese. One species is new (*Stephanoprora mergi*) and two are recorded for the first time from North America (*Echinoparyphium elegans* and *Psilochasmus longicirratu*s). The other species figured are *Echinostoma revolutum*, *Hypoderaeum conoideum*, *Zygocotyle lunata*, *Apatemon gracilis* and *Notocotylus attenuatus*.—T. W. M. CAMERON.

I. HORSFALL, Margery W., & JONES, Myrna F. (1937). **The Life History of *Choanotaenia infundibulum*, a Cestode Parasitic in Chickens.**—*J. Parasit.* 23. 435-450. 6 figs., 1 table. [5 refs.]

II. ACKERT, J. E., & REID, W. M. (1937). **Age Resistance of Chickens to the Cestode *Raillietina cesticillus* (Molin).**—*Ibid.* 558.

I. Reference is first made to experimental infection by previous workers of chickens with the cysticeroid stage of *Ch.i.*, by feeding them with numbers of

three naturally infected arthropods, *viz.* the house fly, *Musca domestica*, and the two beetles, *Geotrupes sylvaticus* and *Cratacanthus dubius*.

The present authors collected and dissected miscellaneous beetles and nymphal and adult grasshoppers to see if they contained cysticercoids of *C.i.* If representative members of a single group were free, the remainder were fed tapeworm eggs by special techniques, which are described. The arthropods were killed at intervals, and if four or more apparently infective cysts were found they were fed to a chicken. A method of rearing the grasshopper *Melonoplus femurrubrum* from the egg stage for controlled experiments is described.

The following species of new intermediate hosts were determined:—the beetles *Stenocellus debilipes*, *Stenolophus conjunctus*, *Alphitophagus bifasciatus*, *Apocellus sphaericollis*, *Ataenius cognatus*, *Aphodius sp.*, and *Aphodius granarius*, and the grasshoppers *Dicromorpha viridis* and *Melanoplus femurrubrum*.

It was found by daily examination of faeces that birds passed segments of *C.i.* 13-15 days after being fed the cysts. The varying morphology of the cysticercoids in the beetle (*A. granarius*) and the grasshopper (*M. femurrubrum*) is detailed and illustrated, and the minimum time for the cysts to reach the infective stage in these hosts was determined, cross-infection experiments proving them to be the same species. Non-infective cysts have a tail, but this is lost at the infective stage.

II. The authors administered about 50 infective cysticercoids of *R.c.* to 15 chickens 20-51 days old, which resulted in an average parasitism of 4.87 worms per bird, each worm averaging 94.91 proglottids. A similar experiment with 27 birds of the same flock, but 71-150 days old, resulted in an average of 3.22 worms (averaging 79.3 proglottids) per bird.

The differences in the number of worms and their size, as judged by the average number of proglottids, in the two age groups were submitted to critical analysis and found in each case to be five times as great as the probable error. These results demonstrate that chickens about 9-20 weeks old may be much more resistant to the existence and growth of *R.c.* than are younger birds (about 4-8 weeks old) in the same flock.—C. V. WATKINS.

JOYEUX, C., SENEVET, G., & GROS, H. (1938). Un cas de *Cysticercus fasciolaris* chez le lapin domestique. [*C.f. in the Domestic Rabbit*].—*Arch. Inst. Pasteur Algér.* 16. 26-30. [6 refs.]

The authors describe two complete cysticerci, obtained from the liver of a rabbit; they had all the morphological features of *C.f.* Two smaller cysts from the surface of the same organ were apparently degenerate larvae of the same species. These cysticerci are most unusual in rabbits.—C. V. WATKINS.

CZELNY, K. (1939). Wągrzyca u ludzi i wągrzyca świń w Polsce w świetle statystycznym. [*Human and Animal Cysticercosis in Poland*].—*Przegl. wet.* 54. 110-117. 3 tables.

Statistics compiled for recent years prove that the incidence of cysticercosis in Poland has not diminished.

TALYSINE, T. T. (1936). Deistvie ekstrakta *Diphyllobothrium latum* (L.) na motornuiu funkciu izolirovannogo tonkogo kišečnika. [*Effect of an Extract of *D.l.* on the Movement of the Isolated Small Intestine*].—*Pathogenic animals*. pp. 357-366. 10 figs. [5 refs.] [French summary]. Moscow: All-Union Inst. exp. Med.

T. experimented with a suspension of pulverized parasites in Ringer-Locke

solution. The strength of the solution used varied from 1:5,000 to 1:100,000, and an inhibitory action on the intestine was noticed with a concentration of 1:10,000 or more. After lavage with Ringer-Locke solution this effect disappeared, and the intestine functioned normally.

It was found that a concentration of 1:1,000 of the extract lowered the "pilocarpine tone", even after eserine had been applied, and strengthened the contractions of the intestine. T. believes that the inhibition of the "pilocarpine tone" is caused by the action of helminthic toxins on the small intestine.

MUELLER, J. F. (1938). **The Life History of *Diphylobothrium Mansonoides* Mueller, 1935, and Some Considerations with Regard to Sparganosis in the United States.**—*Amer. J. trop. Med.* **18**. 41-66. 37 figs. on 8 plates. [17 refs.]

M. describes the life-history of *D. mansonoides*, which he found in 4.6% of cats examined; he emphasizes that it is a species distinct from *D. mansoni*.

Eggs from cats hatch in 9-120 days, recent infestations in cats tending to produce the early-hatching eggs. The first intermediate hosts are various copepods including *Cyclops leuckarti*, *C. viridis*, and *C. bicuspidatus*, these becoming infested by ingestion of coracidia. These copepods seem to accelerate the hatching when placed with otherwise delayed hatching eggs. The development in cyclops resembles that of *D. mansoni*. The procercooids become mature in size after 14 days, but disintegrate in water when released from the cyclops, owing to their thin cuticle. The latter thickens and the anterior spines become more prominent from the 18th-21st day, and the parasites are then able to survive for 2-5 hours in 0.2% HCl in water. Adult copepods collected by the author in the U.S.A. were usually parasitized; nauplius larvae were very occasionally infested.

M. outlines experimental infection of second intermediate hosts, *viz.*, field mice, white mice, g. pigs, white rats, cottontail rabbits, English sparrows, chickens, frogs, cats and rhesus monkeys. Only mice were regularly infested by oral administration; this occurred rarely in rabbits, g. pigs, cats and monkeys. In snakes (*Natrix*), apparently the chief second intermediate hosts, natural infestations are regularly found. Certain animals were tested for susceptibility to subcutaneous injection of procercooids, and infestation was set up in mice, rats, cats and monkeys.

Passage of spargana may be made repeatedly through mice and white rats by oral administration, the procercooids apparently undergoing no impairment in vitality; in these experiments they did not reach the adult stage, and no asexual reproduction occurred.

The domestic cat is the chief definitive host, and the dog is a definitive host to a lesser degree; the bobcat, however, is the natural host.

M. suggests that *D. mansonoides* is a probable cause of human sparganosis, especially in Florida and Texas.—C. V. WATKINS.

FRASER, A. H. H., THOMSON, W., ROBERTSON, D., & GEORGE, W. (1938). **The Influence of the Nutritional Condition of Lambs on their Susceptibility to an Artificial Infestation with Parasitic Nematodes.**—*Emp. J. exp. Agric.* **6**. 316-322. 3 tables. [5 refs.]

One half of a flock of 40 worm-free lambs 2-3 months old was fed a ration sufficient to maintain life but insufficient for normal growth. The other half received a full production ration. Appropriate management and repeated faecal examinations ensured that the lambs were free from parasites. After a month a dose of parasitic larvae was given to each lamb by stomach tube, and was repeated every two weeks until about 28,700 larvae per head had been administered. The

lambs were slaughtered 113 days after the commencement of the experiment, and the helminth content of their abomasums was determined. The average number of worms recovered from those of the ill-fed lambs was :—*Ostertagia*, 229, *Haemonchus*, 81, and *Trichostrongylus*, 3. In the well-fed group the relative numbers were :—*Ostertagia*, 11, *Haemonchus*, 2, and *Trichostrongylus*, none. It is concluded, therefore, that the level of nutrition has a profound effect on the resistance of lambs to worm infestation.—D. D. OGILVIE.

KERR, K. B. (1938). **Studies on the Passive Transference of Acquired Resistance to the Dog Hookworm and Pig Ascaris.**—*Amer. J. Hyg.* **27**. 60-66. [7 refs.]

Serum from dogs and mice which had acquired a resistance to dog hookworm was injected into mice, followed by the oral administration of larvae. Likewise, g. pigs were given serum from g. pigs made resistant by natural infection; they were then given ascaris eggs. Three of the hookworm experiments gave negative results; in the other three tests done, 7 out of 17 mice survived, while 17 out of 18 controls died. In the pig ascaris experiments, three of the seven g. pigs which received "immune" serum survived, whereas six out of seven controls died. The results suggest that a humoral immune antibody is present in resistant animals.

—R. FISHER.

RAYSKI, C. (1937). O występowaniu u psów w okolicach Warszawy gatunku *Ancylostoma caninum* (Ercolani, 1859). [*A.c. in Dogs around Warsaw*].—*Wiad. weteryn.* **16**. 343-349. 2 figs., 1 table. [Numerous refs.] [French summary].

R. states that *A.c.* infestation in dogs is rare in Poland. He found only three affected dogs, although numerous cases of infestation with other ancylostomes were noted. The bulk of the article consists of a review of the literature.

PARNELL, I. W. (1938). **Studies on the Bionomics and Control of the Bursate Nematodes of Horses and Sheep. V. Comparisons of the Lethal Effects of some Non-Nitrogenous Fertilizers on the Free-Living Stages of Sclerostomes.**—*Canad. J. Res. Sect. D.* **16**. 73-88. 6 figs., 1 table. [Numerous refs.] [See also *V. B.* **8**. 517].

P. tested the effects of potash or calcium fertilizers on sclerostome larvae in manure under experimental conditions similar to those described in previous papers. He found that kainit would sterilize 23 times its weight of fresh manure, muriate of potash, 17 times, carbonate of potash, 13 times, and sulphate of potash, 5 times. Superphosphate was of little value, and basic slag and raw rock phosphate were useless. Lime was practically useless, although quicklime might kill if the manure was heated to charring point.—T. W. M. CAMERON.

CLAY, A. L. (1938). **A Note on the Prevalence and Pathogenic Importance of *Hyostrongylus rubidus* in Pigs in North Queensland.**—*Aust. vet. J.* **14**. 194-197. [8 refs.]

*H.r.* was present in 52.4% of pigs examined at a bacon factory in North Queensland. An outbreak was investigated at Atherton in which this parasite was present in large numbers, one mild case harbouring 1,950 worms. Associated with severe infestations were extensive haemorrhagic areas with erosion of the crests of folds of the mucous membrane, and formation of diphtheritic membranes. In the outbreak, ten clinical cases were observed, and there were three deaths; the affected animals were about five months old. Treatment with carbon bisulphide in capsules (0.1 ml. per kg. body weight) was adopted, but apart from improvement of appetite, effects were indefinite.—H. McL. GORDON.

KWIATKOWSKA, Aniela, & MOŚCICKI, Marian. (1988). Badania statystyczne nad występowaniem w Polsce nicienia *Gongylonema pulchrum* (Molin 1857). [The Occurrence of *G.p.* in Poland].—*Wiad. weteryn.* **17**. 186-191. 4 figs., 3 tables. [10 refs.] [French summary].

A detailed description of *G.p.* is followed by results of the investigation as to its incidence in cattle in Poland. The parasite was found in 11-23% of five lots of animals totalling 542; in one locality the incidence was as high as 93%.

—V. CHLÁDEK (PRAGUE).

SAVICKIS, J. (1987). Stirnu kirmelinis plaučiu uzdegimas Lietuvoje. [Verminous Pneumonia of Deer in Lithuania].—*Vet. ir Zootech., Kovno*. **14**. 921-926. [German summary].

In 1937 there was a high mortality among roe deer in Lithuania, and 92.5% of those affected were young animals. Verminous pneumonia due to *Dictyocaulus viviparus* was determined as the cause of death, the bad weather of the year being a predisposing factor.—A. PABIJANSKAS (KAUNAS).

CAMERON, T. W. M. (1988). Investigations on Trichinosis in Canada. I. A Preliminary Survey of the Incidence of *Trichinella spiralis* in Hogs in Eastern Canada.—*Canad. J. Res. Sect. D*. **16**. 89-92. 3 tables. [2 refs.]

An examination of 729 hogs from eastern Canada revealed 15 cases of trichina infestation. All samples were examined by compression and by digestion with either pepsin or papain.

I. CULBERTSON, J. T., & KAPLAN, S. S. (1987). Passive Immunity in Experimental Trichiniasis.—*J. Parasit.* **23**. 560.

II. CULBERTSON, J. T., & KAPLAN, S. S. (1988). A Study upon Passive Immunity in Experimental Trichiniasis.—*Parasitology*. **30**. 156-166. 4 tables. [12 refs.]

I. Mice were protected against *Tr. spiralis* by injections of anti-trichinella rabbit serum. An antibody was found in the blood which appeared to act specifically against the larvae maturing in the intestine. Only 17.6% of larvae developed into adults in mice so treated, as against 86% in mice treated with normal serum and 87.1% in controls. The immune serum did not appear to act against larvae in the muscles; here the number of recovered larvae per larva fed was 44 in immunized mice and 69.9 in controls, i.e., no lower than the proportion expected in animals treated with immune serum.

II. This is a fuller account of the work reported in I.

RODHAIN, J., & GILLAIN, J. (1988). Présence de nodules à *Onchocerca* chez un buffle du Cap dans le Haut-Ituri. [Presence of *Onchocerca* Nodules in a Cape Buffalo in Upper Uturi].—*Ann. Soc. belge Med. trop.* **18**. 85-88. 4 plates. [4 refs.]

After a discussion of the incidence of *Onchocerca* in bovines, the authors describe the presence of numerous onchocerci in fibrous nodules in the umbilicus of a wild buffalo. No microfilariae were found. The parasite was provisionally grouped as *O. gibsoni* from its structure, although the nodule more closely resembled *O. volvulus* of human beings. Onchocerci were not found in other buffaloes examined.—S. F. BARNETT.

## IMMUNITY

EVANS, S. A. (1938). **Result of Tuberculin Test of a Herd of Ankole (Sanga) Cattle from Uganda.**—*Rep. Dep. vet. Sci. Tanganyika, 1937.* pp. 25-26. 1 table.

The author was able to carry out detailed P.M. examinations on all animals tested and the results were published simply to emphasize the reliability and practical value of the tuberculin test. The high incidence of T.B. in Ankole (Sanga) cattle as opposed to the negligible incidence in zebu stock in general is of interest.

RIVERA, E. (1937). Ueber die intravenöse Tuberkulinisierung beim Rinde. [**The Intravenous Tuberculin Test in Bovines**].—*Inaug. Diss., Hanover.* pp. 51. 1 table, 14 charts. [12 refs.]

Tuberculin was injected intravenously in doses of 0.4 ml. into 25 cows. A positive reaction was shown by a rise of temperature beginning 1-4 hours after injection, rising to a maximum of 41°-42°C. after 5-9 hours and falling from the 9th to the 13th hour. The general disturbance was shown by acceleration of the pulse and respiration, and by shivering, etc. The reactions were controlled by intradermal tests and P.M. findings. Ten cows were positive to both tests and eight negative. Of the remaining seven, three were positive to the intravenous test and negative to the intradermal, while the reverse was the case with the other four. P.M. examinations were carried out on 14 cases and agreed with both tests in seven positive cases and in five negative cases. There was disagreement in the other two animals. R. concludes that the intravenous test is valuable as it enables a rapid diagnosis to be made.—P. S. WATTS.

- I. FINZI, G. (1937). L' "esotubercolina" (E.T.F.) [**Exotuberculin**].—*Profilassi.* 10. 27-29. [3 refs.]
- II. NEGRI, R. (1938). Sulla durata dell'attività della "Esotubercolina Finzi" (E.T.F.) [**Duration of Potency of Exotuberculin**].—*Ibid.* 11. 87-91. 4 tables, 3 charts. [8 refs.] [French and German summaries].
- III. ROGONI, A. (1938). La reazione intrapalpebrale nella diagnosi della tubercolosi bovina mediante "esotubercoline" preparate dai mezzi di Zuwerkalow-Sarkisoff e Sauton. "Valore letale" e "potere cutaneo". [**The Intrapalpebral Exotuberculin Test for Bovine TB.**].—*Ibid.* 92-97. [15 refs.] [French, Spanish and German summaries].

I. This article is a general summary of other articles abstracted elsewhere in this bulletin [see especially *V.B.* 5. 255; 6. 249, 436, 527 and 600; and 7. 406].

II. Three lots of polyvalent and mixed exotuberculin prepared in 1932, 1936 and 1938 respectively and stored [no details] in phials away from light did not in any way differ in their diagnostic properties when tested on 60 bovines of the same herd. Double doses of fresh exotuberculin had no action on animals which were not tuberculous.

III. The "intrapalpebral" test with Finzi's exotuberculin was quite reliable when it was prepared by growing tubercle bacilli either on Sauton's medium or on the potato medium of Zuwerkalow and Sarkisoff. On the other hand, subcutaneous and intramuscular tests made with exotuberculin prepared from bacilli grown on the latter medium gave unsatisfactory results; on this medium the two components of allergic tuberculins, the "cutaneous substance" and the "lethal substance" are not produced in the desired proportions. There is, in fact, a low proportion of the "lethal substance".—HANS GRAF (ZÜRICH).

SEIBERT, Florence B., PEDERSEN, K. O., & TISELIUS, A. (1938). **Molecular Weight, Electrochemical and Biological Properties of Tuberculin Protein and Polysaccharide Molecules.**—*J. exp. Med.* **68**. 413-438. 2 text figs., 3 figs. on 1 plate, 10 tables. [Numerous refs.]

By means of sedimentation in the Svedberg ultra-centrifuge [*V. B.* **9**. 124.], and by diffusion and electrophoresis, the authors sought to determine the molecular weight and homogeneity of the tuberculin protein and polysaccharide molecules, as found in their natural state in unchanged filtrates from cultures of tubercle bacilli. The results have been compared with data obtained on fractions isolated by chemical procedures from them or from old tuberculin. The polysaccharide isolated by electrophoresis appeared to be practically the same in sedimentation and in precipitin reactions as that isolated by chemical procedure.

A practically homogeneous protein of a molecular weight of 32,000 was isolated from the culture filtrate of human tubercle bacilli by ammonium sulphate precipitation. This is thought to be an aggregate of two original molecules formed during the precipitation. This larger molecule exhibits highly antigenic properties in the precipitin reaction and produces an anaphylactic type of local skin reaction in tuberculous g. pigs, in contrast with the true tuberculin type of reaction caused by the fraction of the purified protein derivative of tuberculin.—H. V. HUGHES.

HÄNTSCH, L. (1938). Photometrische Messungen an Bakterienagglutinationen. [**Photometric Measurements of Bacterial Agglutination**].—*Z. ImmunForsch.* **93**. 154-169. 16 charts. [10 refs.]

H. describes a method of measuring with considerable accuracy the actual degree of particulation which has occurred in any agglutinating system. A Zeiss turbidimeter was used to measure changes in density in the system, and by graphing turbidimeter readings against serum dilutions, curves were constructed for various agglutinating systems, (*i.e.*, various organisms and their homologous antisera). The turbidimeter reading is influenced not only by the degree of particulation but also by the shape and size of the particles formed, and it is claimed that it is possible to estimate from the curves constructed the amount of agglutinable material present in any given system.—E. J. PULLINGER.

PRÉVOT, A. R., & POCHON, J. (1938). Étude graphique des floculations à double zone des sérums anticharbonneux. [**Graphic Study of Double-Zone Flocculation in Anthrax Antisera**].—*C. R. Soc. Biol. Paris.* **127**. 1168-1170. 1 graph. [6 refs.]

The results obtained by the titration of graded volumes of anthrax antiserum with a constant amount of filtrate containing the somatic and capsular antigens are illustrated in graphical form. The authors draw analogies between their results and those obtained with tetanus. In both cases, the time of initial flocculation in each zone for filtrates of varying age were situated on two curves analogous to an equilateral hyperbola. Moreover, the constant relating the volumes of serum giving initial flocculation with the same antigen in each of the two zones was approximately 3 for tetanus and lay between 6 and 7 for anthrax.—R. O. MUIR.

SALOW, H. (1937). Ueber den Wert verschiedener Antigene bei der Serodiagnostics der Rindertuberkulose. [**Value of Various Antigens in the Complement-Fixation Test for Bovine TB**].—*Inaug. Diss., Berlin.* pp. 26. 2 tables. [Numerous refs.]

Four groups of cows were examined by the c.-f. test using nine different antigens:—Witebsky's original antigen, its modifications by Menck and by

Paarmann, Beller's dry and wet acetone antigens, Beller's formic acid ethyl antigen (in three forms) and tuberculin. The first group comprised 51 animals in the primary stages, the second, 20 advanced cases, the third, 28 chronic cases, and the fourth, 43 negative reactors. Final diagnosis was by P.M. examination. The average figure for the detection of cases, on an average for all the above tests, was 78.4% of the first group, all of the second, and 89% of the third. Menck's method was the most satisfactory, since, though less sensitive than other modifications, it gave only 4.7 false positives. The more sensitive antigens of Beller gave a large proportion (up to 14%) of non-specific reactions.—P. S. WATTS.

LOVE, E. L. (1938). **Preparation of Brucella Abortus Antigen and the Plate Agglutination Test.**—*Vet. Med.* 33. 276-279. [2 refs.]

The preparation and standardization of *Br.a.* antigen for use in the rapid plate method of diagnosis are described. The strain is grown on beef-liver infusion agar (pH 7.0) for 72 hours, the collected growth washed with carbol saline, and the final suspension standardized so that 0.5 c.c. gives a centrifugal deposit of 0.5 in. depth in a Hopkins tube. Details are given for carrying out and interpreting the aggl. test.—S. J. EDWARDS.

BEHNKE, J. (1937). Die Brauchbarkeit der Schnellagglutination für die veterinärpolizeiliche Feststellung des seuchenhaften Verkalbens. [**Value of the Rapid Agglutination Test for Bovine Brucellosis**].—*Inaug. Diss., Berlin*. pp. 23. 1 table. [Numerous refs.]

By comparing the standard tube method with the rapid tests according to the technique of Huddleson and Abell and that of Donham and Fitch it was found that the latter tests were too sensitive for application in the control of contagious abortion. Of 1,040 sera tested by the Huddleson and Abell technique, 55% were positive at titres of 1:25 or over, and only 28% by the tube method; of 1,000 sera tested by the Donham and Fitch method 43% were positive and only 8% by the tube method. All sera which were negative to the rapid test were also negative to the tube method. Therefore B. suggests that sera may first be submitted to the rapid test, and all reacting sera then verified by the tube method.—S. J. E.

DIERNHOFER, K. (1938). Die diagnostischen Verfahren zur Feststellung der Bruzellose. [**Diagnosis of Brucella Infection**].—*Dtsch. tierärztl. Wschr.* 46. 677-679. [1 ref.]

A brief discussion of the methods available for the diagnosis of brucella infection in cattle, *viz.*, the agglutination, Meinicke-Klärung, complement-fixation and allergic tests. [There are, of course, cultural and animal inoculation methods, but they are only applicable to individual animals and not to herds]. D. considers that of the foregoing the aggl. test is best for general use. The rapid slide aggl. test he looks upon only as a helpful adjunct to the tube test. The question of the critical diagnostic titre for aggl. tests is discussed.—E. J. PULLINGER.

I. FRÖHLE, O. (1938). Die Brauchbarkeit der Sachweh-Reaktion zum Nachweis der Banginfektion. [**Use of the Sachweh Flocculation Test for the Diagnosis of Brucella Infection**].—*Inaug. Diss., Munich*. pp. 49. 12 tables. [Numerous refs.]

II. RUDOLF, H. (1938). Erfahrungen mit der Diernhoferschen Schnellblutmethode im Laboratorium und Praxis. [**Diernhofer's Rapid Agglutination Test for Brucellosis in the Laboratory and in Practice**].—*Dtsch. tierärztl. Wschr.* 46. 679-681. [1 ref.]

I. The Sachweh and Meinicke flocculation tests were compared with the

complement-fixation and aggl. tests on 3,509 blood samples and 261 milk samples. In 78 % of the cases, all four tests agreed. Of the 856 finally considered positive, 90 % were detected by the Sachweh reaction, 56 % by the Meinicke, 59 % by the c.-f. and only 46 by the aggl. test. It appears, however, that little attention was paid to the possibility of false positives in the various tests, and there is no evidence of *abortus* infection in the animals concerned other than that provided by the tests themselves. It is considered that part of the discrepancy may be due to the fact that the Sachweh test becomes positive before the aggl. test and remains positive after the agglutinin titre has dropped.

II. During 1937, 1,544 samples were examined by the rapid aggl. method in the field and by the ordinary aggl. tests in the laboratory. 197 of the samples positive to the rapid test were negative to the laboratory test, while 173 of those negative in the former were positive in the latter. Laboratory workers skilled in the rapid test then examined 103 cattle under field conditions and found 20 positive. These results were all confirmed by the ordinary agglutination test, and the conclusion drawn is that care is necessary to prevent false positive reactions with the rapid test. False negative reactions can only be checked by the additional use of other tests.—P. S. WATTS.

ZAGRODZKI, K. (1937). Ujednostajnioma (standart) metoda odczynu aglutynacji probówkowej przy rozpoznawaniu brucellozy bydła (ronienia zakaznego u bydła). [Standardization of the Agglutination Test for Brucellosis].—*Pam. pańs. Inst. nauk. Gosp. wiej. Puławy*. 1. 15-31. 2 tables. [Numerous refs.] [French summary]. Suppl. to *Wiad. weteryn.* 16.

Z. speaks of the routine examination of strains of *Br. abortus* to be used for the preparation of antigens for aggl. tests, with special reference to rough strains. He speaks of the preparation of an antiserum for tests of the antigen, and of the preparation of the bacillary suspension. There is nothing new in the article.

PRISTOJKOVIC, S. (1938). Agglutiniert das Hundeblood Abortus-Bang-Bakterien ? [Tests of Canine Blood for Agglutinins for Brucella].—*Wien. tierärztl. Mschr.* 25. 511.

The blood sera of 100 dogs, brought to be destroyed at the Vienna veterinary school, were examined for the presence of *Br. abortus* agglutinins by the rapid and the tube techniques. None reacted to the rapid method, but by the tube method seven agglutinated at a titre of 1:20, nine at 1:40 and three at 1:80. As no cultural examination was made it is not possible to say whether these agglutinins were specific for *Br.a.* or not.—S. J. EDWARDS.

DI AICHELBURG, U. (1936). Osservazioni sull'agglutinazione delle brucelle. L'agglutinazione da sali. [Salt Agglutination of Brucella].—*Diagn. Tec. Lab., Napoli*. 7. 324-333. [Numerous refs.]

A. tested the agglutinability of ten S strains of *Br. abortus*, five S strains of *Br. melitensis*, and six R strains of *Br. paramelitensis* by, (a) sodium chloride and potassium sulphate (salts with monovalent cations), (b) magnesium sulphate and ammonium sulphate (salts with bivalent cations), and (c) copper sulphate (salt of a heavy metal).

In all tests the *Br.p.* strains gave much more marked agglutination than the *Br.a.* or *Br.m.* strains. *Br.p.* strains were agglutinated by 0.5 % solutions of sodium chloride, and 10 % solutions of potassium sulphate and upwards. But the *Br.a.* and *Br.m.* strains were only agglutinated by sodium chloride in concentrations of 20 % upwards, while potassium sulphate had no effect whatever. Magnesium

sulphate and ammonium sulphate agglutinated the *Br.p.* strains in concentrations of 0.6% and 0.8% respectively and the *Br.a.* and *Br.m.* strains in 40% and 50% concentrations respectively. Copper sulphate agglutinated the *Br.p.* strains in concentrations of 0.01% upwards and the *Br.a.* and *Br.m.* strains only in saturated solutions.

Salts with monovalent and bivalent cations agglutinated all strains of all three types in very small granules which formed a soft deposit that was very easily re-emulsified. Copper sulphate produced bigger flakes, which were less easily dispersed. Agglutination usually began after 30 minutes. A. concludes that salt agglutination is a useful method for the differentiation of *Br.p.* from *Br.a.* and *Br.m.*

When suspensions were shaken with equal quantities of chloroform and left for 2-8 hours, then heated in a waterbath to drive off all remaining traces of chloroform, the brucella were found to be no longer agglutinable by sodium chloride and potassium sulphate, but the effect of the other three salts was unchanged.

HEIDELBERGER, M., & KENDALL, F. E. (1934). **Quantitative Studies on the Precipitin Reaction. The Role of Multiple Reactive Groups in Antigen-Antibody Union as Illustrated by an Instance of Cross-Precipitation.**—*J. exp. Med.* **59**. 519-528. 2 figs., 2 tables. [13 refs.]

Experiments are described which show that antisera to R-salt-azo-benzidine-azo-crystalline egg albumen (which had been fractionated until it was practically non-reactive with sera to crystalline egg albumen over a wide range of concentrations) give precipitates with crystalline egg albumen, by virtue, it is thought, of the specific antigenic stimulus due to the dye itself, and not as a result of the antigen being split in the animal body to form the same antibody as does egg albumen itself.

The quantitative course of the reactions is very similar for the dye-antidye and egg albumen-anti-egg albumen systems, but differs for the cross-reaction between egg albumen and antidye.

It is suggested that in this one-sided cross-reaction there may still remain in the dye-protein minor antigenic groupings common to egg albumen itself. These may be somewhat masked by the dominant azo groupings, which determine the homologous specific reaction, thus preventing the *in vitro* union of dye and anti-egg albumen.—H. V. HUGHES.

I. SAENZ, A. (1937). Contribution à l'étude de l'allergie et de l'immunité produites chez le cobaye par l'inoculation de bacilles tuberculeux morts enrobés dans de l'huile de vaseline. [**Allergy and Immunity Produced by the Inoculation of Tubercle Bacilli Embedded in Vaseline**].—*Rev. Immunol.* **3**. 530-541. [Numerous refs.]

II. SAENZ, A. (1938). Caractères de l'allergie et de l'immunité conférées au cobaye par l'inoculation de bacilles morts enrobés dans de l'huile de vaseline. [**Allergy and Immunity Produced in Guinea Pigs by the Inoculation of Dead Tubercle Bacilli in Vaseline**].—*Ann. Inst. Pasteur.* **60**. 58-94. 5 figs., 4 tables. [Numerous refs.]

I. The author confirmed his findings that a heightened allergy to tuberculin can be demonstrated in g. pigs after they have been inoculated with mammalian tubercle bacilli suspended in vaseline [*V. B.* **8**. 162]. This allergy also occurs with avian tubercle bacilli and avian tuberculin, *Pfeifferella mallei* and mallein, *Brucella melitensis* and melitin, *Mycobacterium johnei* and johnin, and *Pasteurella pseudotuberculosis* and an extract from this organism. The intratesticular route

was better than the intrapulmonary or the intramuscular route for sensitizing the g. pigs. The increase in allergy was not paralleled by an increase in immunity, although some increase could be demonstrated.

II. This article is a repetition and an amplification of the work of S. described in I [p. 557]. For those interested, it is a good summary of the work on the subject.—D. L. HUGHES.

WEINBERG, M., & KREGUER, A. (1938). Préparation d'un sérum antibotulique bivalent par l'injection au cheval de toxines englobées dans la lanoline. [Preparation of a Bivalent Botulinus Antiserum by Injection of a Horse with Toxins in Lanoline].—*C. R. Soc. Biol. Paris*. 128. 949-951.

A horse was hyperimmunized against *Clostridium botulinum* Type A by a series of increasing doses of culture filtrate, incorporated in lanoline, at intervals of 15 days. After bleeding, the horse was rested for a month and then similarly hyperimmunized against Type B. The Type A titre was then restored by a final injection of Type A toxin. The bivalent serum thus obtained, with an antitoxic titre of 7,500 Type A units and 1,200 Type B units, was of great therapeutic value compared with the usual *botulinus* antiserum containing 500 units.—R. O. MUIR.

FREUND, J., & OPIE, E. L. (1938). Sensitization and Antibody Formation with Increased Resistance to Tuberculous Infection Induced by Heat Killed Tubercle Bacilli.—*J. exp. Med.* 68. 273-298. 7 figs., 11 tables. [7 refs.]

The intradermal inoculation of heat-killed tubercle bacilli into a normal rabbit produces a nodule which persists for 8-12 weeks; in a sensitized rabbit a lesion is produced which ulcerates in 1-3 weeks, followed by complete healing. Sensitization is more rapid by intradermal than by intravenous or subcutaneous inoculation. Complement-fixation is demonstrable after repeated injections of heat-killed bacilli. Small doses of BCG produce a more rapid sensitization than heat-killed bacilli; this difference disappears after repeated doses. No relationship has been established between the degree of sensitization of a rabbit and its resistance to infection. In a fatal infection, sensitization disappears; in rabbits recovering from infection, skin sensitization at first decreases and then increases as recovery proceeds. The titre of complement-fixation diminishes with recovery from infection.—E. C. HULSE.

COULAUD, E. (1938). Allergie et immunité produites par les bacilles morts émulsionnés dans des huiles végétales. [Allergy and Immunity Produced by the Inoculation of Dead Tubercle Bacilli Suspended in Vegetable Oils].—*Ann. Inst. Pasteur*. 61. 355-399. 13 figs., 3 tables. [16 refs.]

Experiments usually employing 6-9 rabbits were carried out to ascertain the degree of resistance to infection given by the subcutaneous or intravenous injection of dead *Mycobacterium tuberculosis* suspended in sweet olive oil, rancid olive oil or castor oil. The results in general showed that:—(1) dead organisms suspended in these oils gave more protection when injected subcutaneously than similar organisms suspended in saline, but less than when paraffin or lanoline was the excipient; (2) that when injected intravenously, the protection afforded was equal to that produced using the paraffin excipient, and (3) that when injected intravenously the emulsion caused a broncho-pneumonia which was fatal in many cases. Photomicrographs of this condition are given.—P. S. WATTS.

GRATIA, A., & GORECZKY, L. (1938). Das Ultrazentrifugieren der Immunkörper und der normalen bakteriziden Stoffe. [Ultracentrifugation of Immune

**Bodies and Normal Bactericidal Substances].—Z. ImmunForsch. 93. 18-26. 3 figs., 4 tables. [10 refs.]**

The serum of a rabbit which had been immunized against sheep red blood corpuscles was centrifuged at about 85,000 r.p.m. for one hour. Thereafter the haemolysin and haemagglutinin titres of different layers of the centrifugate were measured and compared. The haemolysin titre of the uncentrifuged serum was 1:1,000, and after centrifugation the upper layer of the centrifugate showed a titre of 1:500 which gradually increased through the deeper layers to 1:2,000 near the bottom. In the case of the haemagglutinin, on the other hand, the original titre was 1:1,000, and after centrifugation the upper layer showed a titre of 1:900, and the bottom layer, 1:1,100. These findings are taken as evidence that the haemolysin and haemagglutinin molecules have different sizes.

When complement was centrifuged it appeared that the strongest concentration was to be found in the middle layers. It was concluded that this result was illusory due to the destruction of complement by heat in the lower layers of the centrifugate. Under the conditions of their experiments the lower layers of serum attained a temperature approaching 65°C. during centrifugation.—É. J. P.

KÖVES, J., & HOFFMANN, F. (1937). Mennyi ideig marad a befecskendezett azérum a szervezetben? [**The Duration of Retention of Foreign Antiserum Injected into Domestic Animals**].—*Közl. Oesszehas. élet- és kórtan Köréből*. 28. 139-144. Numerous tables, 2 charts.

The authors injected various animals subcutaneously with potent homologous and heterologous agglutinating sera, in order to study the dispersion of the serum introduced into the organism. From time to time they determined the decrease in the amount of the agglutinin in the blood. In piglets the homologous serum decreased daily by 5%, and the heterologous by 10%. In adult pigs the dispersion was somewhat slower. In animals with a lower rate of metabolism (sheep and cattle), the decrease of the heterologous serum was 5%.—G. SÁLYI (BUDAPEST).

ECKER, E. E. (1938). Rôle des phénomènes d'oxydation et de réduction dans l'immunologie. [**Oxidation and Reduction in Immunology**].—*Rev. Immunol.* 4. 528-547. [Numerous refs.]

This review article analyses and co-ordinates the existing knowledge of the bearing of oxidation-reduction phenomena upon immunological problems. The relationship of these phenomena to antibody production, to bacterial toxins and the virulence of certain bacteria, and to infection in general is fully discussed. The action of large doses of vitamin C in the production of antibodies in animals is attributed to their reduction potentials, although the protective action of the vitamin against certain bacterial toxins has not been completely proved as being solely due to this reductive power. Ascorbic acid appears to play an important role in complement action in the body, and theories are reviewed as to the nature of this action, especially in relation to the part played by glutathione, in particular the sulphhydryl groups (-SH), as a link in the oxidation-reduction system. The possible nature of complement and the role of ascorbic acid in relation to anaphylaxis and hypersensitization are discussed, as is also the role of -SH groups in the antigenic specificity of certain enzymes (in particular, urease). The immunological actions of keratins are also reviewed and the difference between the reactions of oxidized keratins and those of reduced keratins seems to depend either on the groupings -S-S- or -SH acting as "determinant groupings", or on the reduction of the -S-S- chain involving inter- or intramolecular rearrangements. Oxidation-reduction mechanisms are thus concerned in a large number of complex phenomena,

and the need is emphasized for more research leading to a fuller understanding of the many empirical observations made up to the present time. The reader is referred to the text for a more detailed exposition of the present knowledge. A full and comprehensive bibliography is given.—ALFRED EDEN.

PERAGALLO, I., & SCUTI, R. (1987). Sull'azione combinata dell'ormone sessuale maschile e della vitamina E come stimolante i processi di difesa dell'organismo negli stati infettivi. [**The Combined Action of the Male Sex Hormones and Vitamin E in Resistance to Infection**].—*Policlinico Sez. med.* **44**. 639-644. 8 figs. [5 refs.]

The authors confirmed by experiments MAGARA's theory that male sex hormones exert a protective action on mice infected with pneumococci [V. B. 9. 928.], but they did not find that this action, though more apparent in male mice, was entirely specific to that sex.

In a further series of experiments, designed to determine the action of vitamin E, 10 male and 19 female mice were injected with a hormone preparation alone (testosterone); 11 males and 11 females were injected with a vitamin E preparation alone, and 8 males and 12 females were injected with a mixture of the vitamin E and testosterone, all these mice having been previously infected with one M.L.D. of pneumococci. Of the first group, 2 males and 6 females survived, of the second, 4 males and 5 females, and of the third, 5 males and 6 females.

It was concluded that vitamin E and testosterone have greater protective powers when injected together than either injected alone, and that this power is not specific to male mice. Later experiments showed that this power was effective when up to 5 M.L.D. of pneumococci were injected.

- I. JACQUET, J. (1987). Contribution à l'étude de l'immunité dans les infestations intestinales par les nématodes, en relation avec le problème de leur spécificité parasitaire. [**Immunity in Intestinal Infestations with Nematodes, in Relation to their Host Specificity**].—*Thesis, Alfort*. pp. 109. [Numerous refs.]
- II. JACQUET, J. (1988). Immunité et spécificité dans les infestations intestinales par les nématodes. [**Immunity and Specificity in Intestinal Nematode Infestations**].—*Cah. Méd. vét.* **8**. 57-63.

I. This is a review of the literature up to 1987 on immunity in intestinal nematode infestations. J. first classifies the various forms of immunity against these parasites by means of a table. Specificity results from a progressive adaptation of the parasites and their hosts, and is therefore subject to alteration. In abnormal hosts the development of the parasites is impossible or there is interference with egg production. Some parasites become encapsulated under such circumstances, while others reach abnormal situations. The latter parasites may be important as possible starting points for neoplastic formations.

Natural immunity generally signifies resistance to the effects of parasites and is not complete. "Age immunity" is discussed under this heading, and examples are cited.

The mechanism of acquired immunity and the effect of nutrition are summarized.

J. concludes that acquired immunity is never absolute, with a possible exception in the case of acquired immunity of rats to trichinosis.

- II. A summary of I.—C. V. WATKINS.

## DISEASES, GENERAL

PANISSET, L. (1938). Les maladies infectieuses des animaux transmissibles à l'homme. [**Infectious Diseases of Animals Transmissible to Man**]. pp. vii+114. 1 table, 1 photograph. Paris: Vigot Frères. [2nd Edit.] [8vo] [4s.]

This revised edition represents the author's lecture material on comparative pathology prepared for medical students at the Faculty of Medicine at Paris. The following infectious diseases are dealt with:—tuberculosis, rabies, anthrax, brucellosis, glanders, swine erysipelas, swineherd's disease, influenza, dog distemper, foot and mouth disease, diphtheria, psittacosis, spirochaetosis, equine infectious anaemia, Rift Valley fever, tularaemia, typhoid and paratyphoid, and infections transmissible by milk.—J. E.

HOPKIRK, C. S. M. (1938). **Animal Health Problems in New Zealand.**—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 82-86. Weybridge: Imperial Bureau of Animal Health. [5s.]

This is an account of the more important problems, and covers mastitis, sterility, Johne's disease and poultry diseases.

Mastitis is wide-spread, and may affect about half the cows in the best herds. The method of diagnosis chosen for general use is the leucocyte count of gravity cream, though the bromthymol blue test is being introduced. Staphylococci are responsible for about 80% of cases of chronic mastitis. An outline is given of the research work in progress.

Sterility, commonly temporary, causes much trouble, and appears to be of three main types, *viz.*, infective and venereal, nutritional, and that due to testicular atrophy in bulls. The first type is associated with streptococcal infection, which usually clears up spontaneously; the nature of the nutritional type is obscure, as also is the case with the last type. Research is being undertaken. Johne's disease has given some trouble since 1930; since 1932 johnin tests have been carried out, and, since 1937, reactors have been slaughtered. 141 reactors were detected in 40 herds containing 2,920 cattle.

The two most important poultry diseases are coccidiosis and neurolymphomatosis.

In New Zealand, veterinary research work is carried out at Wallaceville, near Wellington, and to a small extent by veterinarians attached to Massey and Canterbury agricultural colleges. Plans to extend the work are outlined.—J. E.

DALLING, T. (1938). **A Review of Some Recent Contributions to Disease Problems of Domesticated Animals.**—*Proc. R. Soc. Med.* 32. 59-70.

ANAEROBIC INFECTIONS.—The diseases caused by *Cl. chauvoei*, *Cl. septicum*, *Cl. welchii*, *Cl. oedematiens*, *Cl. botulinum*, and *Cl. tetani* are reviewed. HENDERSON'S work on immunization against anaerobes, using formalinized whole cultures, was referred to. It was pointed out that work on lamb dysentery and other sheep diseases in this country and Australasia revealed important differences within the *Cl. welchii* group, regarded as a single group until 1922.

VIRUS INFECTIONS.—Recent work on the subject of immunization against virus diseases was dealt with, mention being made of the work of LAIDLAW and DUNKIN and of the author himself on distemper. The use of formalinized tissue containing virus in the prevention of louping-ill in sheep and rinderpest was discussed.

Other research referred to was (a) the alteration of African horse-sickness virus by passage through mouse brain to render it innocuous to horses while it is

still capable of producing immunity, (b) the work of GALLOWAY on filtration and measurement of viruses, and (c) the work of BURNET on the cultivation of viruses in the chorio-allantoic membrane of developing eggs.

**DISEASES DUE TO MINERAL DEFICIENCIES.**—Under this head the following conditions were considered, *viz*, milk fever, lactation tetany, anaemia in pigs, "pine" in cattle and sheep, and "swayback".

The address concludes with a brief reference to "fowl paralysis".—J. C. W.

ROGERS, L. (1939). **Prophylactic Inoculations against Animal Diseases in the British Empire.**—*Brit. med. J.* March 18th. 565-566. 2 tables. [2 refs.]

The article defends the value of research work carried out on animals to minimize disease. Attention is drawn to the enormous amount of suffering in animals that has been saved by preventive inoculation since Pasteur's classical experiments on preventive inoculation against anthrax in sheep. A table gives the officially recorded figures of preventive inoculation in the British Empire, during seven recent years, against five of the principal epizootics, *viz* :—rinderpest, blackleg, haemorrhagic septicaemia, contagious bovine pleuro-pneumonia, and anthrax. A total of over 51 million animals was dealt with. Short notes are given on the symptoms and causes of the diseases, and on the nature and extent of the inoculations carried out. Apart from the huge saving in severe and prolonged suffering among animals, it is estimated that the economic saving during the seven years must be between £40,000,000 and £50,000,000. Members of the medical profession are reminded of the necessity for enlightening the public on the efficacy of experiments on animals for the saving of suffering in the animal kingdom as a whole.—F. J. ANDREWS.

MOLLIN, F. E. (1937). **Disease as a Problem in Animal Production.**—*Proc. Amer. Soc. Anim. Prod.* 1937. pp. 277-286.

This is an article on the problem by a stockfarmer, from the point of view of the livestock producer. The practical difficulties of evolving disease-resistant strains of livestock are commented upon. Disease is only one of the factors causing losses; poisonous plants, lightning, and theft play an important part in M's experience. Where disease is the chief cause, faulty nutrition and the retention of the best breeding animals beyond the economic period of usefulness makes losses more probable, not only due to disease, but also to a lowered birth rate.

—J. A. GRIFFITHS.

- I. STEWART, W. L. (1935). **Research Work into Sheep and Lamb Diseases.** Alan, Duke of Northumberland Memorial Fund. pp. 27. Newcastle-upon-Tyne: Armstrong College. [8vo].
- II. STEWART, W. L. (1936). **Research Work into Sheep and Lamb Diseases.** Second Report of the Management Committee. Alan, Duke of Northumberland Memorial Fund. pp. 34. 1 table, 1 graph. Newcastle-upon-Tyne: Armstrong College. [8vo].
- III. STEWART, W. L. (1937). **Research Work into Sheep and Lamb Diseases.** Third Report of the Management Committee. Alan, Duke of Northumberland Memorial Fund. pp. 82. Newcastle-upon-Tyne: Armstrong College. [8vo].
- IV. STEWART, W. L. (1938). **Research Work into Sheep and Lamb Diseases.** Fourth Report of the Management Committee. Alan, Duke of Northumberland Memorial Fund. pp. 39. 2 figs., 3 tables. Newcastle-upon-Tyne: King's College. [8vo].

I. The Fund was started in 1932 to conduct research into the local or semi-local diseases of sheep which constitute a permanent source of loss to agriculturists and about which existing knowledge is imperfect. A brief account is given in this first report of "cripples" in lambs. [See *V. B.* 4. 535, and 5. 583]. Mention is made of the increasing importance of parasitic diseases in sheep husbandry, and some of the commoner helminth infestations in the north of England are dealt with [see *V. B.* 5. 82]. A short description is given of "pining" in sheep [see *V. B.* 6. 451]. Other items briefly dealt with in the report are:—the method of drenching sheep, lamb dysentery, louping ill, and tick eradication.

II. Work outlined in the previous report is here dealt with more fully. Vaccine and serum treatment of lambs and ewes against lamb dysentery gave very encouraging results. For example, of 4,892 treated lambs on 17 affected farms, only 18 (0.36%) died from dysentery. On these same farms the experiment was controlled by 2,367 untreated lambs, of which 169 (7.14%) died from ascertained dysentery. Experiments carried out on "border pinning" showed that parasitic infestations, threadworms and tapeworms are of great importance in the aetiology of this disease. Evidence was also obtained of the existence of a nutritional factor which acts in conjunction with the parasites in the production of pinning. Chemical analyses of pinning herbage indicated deficiencies in Ca, P, and Fe [*V. B.* 7. 398]. An experiment carried out with a new anti-tick dip indicated the possibility of controlling ticks by dipping at intervals of three weeks. Dosing sheep against parasitic worms with copper sulphate and nicotine is described.

III. Work on the diseases mentioned in the previous reports has been continued. The value of serial dipping of sheep against ticks has been substantiated. An investigation is proposed into the aetiology and prevention of pregnancy disease of ewes.

IV. This reports on the continuation of the previous work in the Northumberland area. A nicotine mixture, which was introduced to overcome the main defects of the older copper sulphate for worms in sheep, is stated to give very good results. Experiments indicate that the mortality in pulpy kidney disease can be greatly reduced by the use of the specific antiserum. An extensive field investigation on border pinning, not yet completed, indicates that considerable improvement in the condition of the sheep can be effected by supplementary feeding with minerals and vitamins or by routine dosing against worms, or by a combination of these methods. On farms where louping ill was reported to occur, it was found that the majority of the losses were due to septic infections, possibly arising from tick infestation. Treatment of hill sheep affected with pregnancy disease with daily injections of dextrose, calcium borogluconate, and magnesium lactate was disappointing. The necessity for adequate rations during pregnancy is stressed; a small portable wooden silo for the preservation of grass is described, for use when artificial feeding is necessary.—N. J. SCORGIE.

PECK, E. F. (1938). **Notes Relating to the Camel.**—*Vet. Rec.* 50. 1052-1054. 2 tables.

The article consists of a few short notes on six diseases and injuries met with in camels in Somaliland, together with tables giving the results of the estimation of the haemoglobin content of the blood of ten camels.

A solution of a proprietary agent, "White Fluid" (an emulsion of tar acids and neutral hydrocarbons) is recommended for the treatment of mange.

For the treatment of traumatic keratitis, a solution of acriflavine followed by atropine, and the protection of the eye by a pad of antiphlogistine, are said to be very effective. A disease suggestive of tick paralysis is described. An immediate

application of "White Fluid" to remove ticks is recommended. A case of severe debility described was apparently caused by heavy infestation with trichostrongyles. *Trichophyton* infection is commonly demonstrable in camel calves, but is easily cured.—F. J. ANDREWS.

GIRARD, G., ROBIC, J., & BUCK, G. (1988). Vaccine et piroplasmoses. [**Vaccinia and Piroplasmosis**].—*Bull. Soc. Path. exot.* 31. 441-444. [1 ref.]

Since 1927 several cross-bred zebu-European cattle have been lost in Madagascar from piroplasmosis following inoculation with vaccinia in the hot wet season. The deaths have been eliminated by reducing the area of the inoculation, and reducing the weight of lymph gathered, from 180-200 g. to 140-145 g. Also as few animals as possible are inoculated in the hot season and a stock of lymph is kept in cold store for use in that period. The authors consider that the vaccinia lowered the resistance of the animals, with the consequence that latent piroplasmosis became acute, or alternatively that there was an increase in virulence in the strain of vaccinia virus used.—S. F. BARNETT.

GRIMPRET, G. (1988). Fièvre aphteuse et theileriose bovine. [**Foot and Mouth Disease and Bovine Theileriasis**].—*Bull. Soc. Path. exot.* 31. 88-87. [1 ref.]

During an outbreak of F. & M. disease in Algeria a simultaneous acute theileria infection was observed. Both improved and native breeds were affected, and calves a few weeks old were liable to a fatal infection. The acute attacks of theileriasis occurred to a lesser extent in cattle which had been premunized. Owing to the co-existence of F. & M. disease, the symptoms of the theileriasis were masked, especially in calves. It is stated that gonacrine was found an effective treatment for theileria infections if applied early enough, but that it had no action on the F. & M. disease.—S. J. GILBERT.

DE KOCK, G. (1988). **Wild Animals as Carriers of Infection**.—*S. Afr. med. J.* 12. 725-730. [19 refs.]

In the introduction, reference is made to a number of diseases in South Africa which occur in domesticated animals and have been observed in some species of wild animals. A brief reference is made to tularaemia, psittacosis and jungle yellow fever by way of analogy.

The paper is divided into three parts:—protozoan, bacterial and virus diseases. Under protozoan diseases, mention is made of the part played by the Harris trap in eradicating tsetse flies, and of the attempt to restrict the movements of game by the use of hessian screens. Under bacterial diseases the occurrence of tuberculosis in the kudu and duiker in the Albany district of the Cape Province is mentioned. Under virus diseases the role of the wildebeest (gnu) as a carrier of the virus of snotsiekte (a form of malignant catarrh) is discussed, as well as that of wild pigs as reservoirs of the virus of African swine fever. The part played by meerkats (*Viverridae*) as carriers of rabies is referred to. The question of game as carriers of F. & M. disease virus in South Africa is discussed and the conclusion reached that, as far as can be determined, game animals in South Africa probably do not act as carriers.—E. M. ROBINSON.

VON HEPDING, L. (1988). Umfang und Ergebnisse der Geflügeluntersuchungen in Preussen in den Jahren 1985 und 1986. [**Results of P.M. Examination of Poultry in Prussia in 1985 and 1986**].—*Arch. Geflügelk.* 12. 129-149. 9 charts. [Numerous refs.] [English summary].

A collective report on P.M. examination of poultry in 15 Prussian Institutes

during 1935 and 1936. The chief causes of death were bacillary white diarrhoea, non-specific intestinal diseases, and coccidiosis. Next in order of frequency were :- non-specific diseases of the ovary and oviduct, intestinal parasites, leucosis, gout, tuberculosis, poisoning, etc. Compared with previous years, there were more deaths reported from TB., pullorum disease, fungous diseases, infectious coryza, leucosis, fowl paralysis, coccidiosis, stomach worms, gout, ovarian and oviduct diseases and poisoning. There was a fall in the number of deaths from fowl plague and fowl cholera, *Salmonella enteritidis* infection, *Bact. coli* infection, non-specific intestinal diseases and non-specific diseases of the respiratory system.

—SASSENIOFF (MUNICH).

SWALES, W. E. (1936). **Two Important Diseases of Ducks in Quebec.**—*J. Agric., Quebec.* **39.** 40-43.

S. discusses duck malaria and the duck stomach worm (*Tetrameres crami*). Duck malaria due to *Leucocytozoon anatis* is common in Quebec, being carried by *Simulium venustum*. It strikes suddenly, infected ducklings dying within a day of the appearance of symptoms. Control depends on the removal of nesting ducks from the vicinity of running water, and isolating them in a screened outhouse from May to July. The stomach worm is carried by fresh-water amphipods, and does considerable local damage. No curative treatment is known, and the keeping of fish is suggested as a means of removing the carriers and so preventing disease.

—T. W. M. CAMERON.

LANDAUER, W. (1937). **Loss of Body Heat and Disease.**—*Amer. J. med. Sci.* **194.** 667-674. [Numerous refs.]

An account is given of studies of frizzle fowls, showing that the evolution of many structural and physiological disturbances involves a chain of events constituted by interactions between environment and organism, with consequent internal adjustment.

The abnormalities of frizzle fowls bear a striking resemblance to the symptoms of Graves' disease. The only trait under immediate gene control is the plumage peculiarity; the other changes are all secondary. Most of the manifestations are simply reactions to environmental temperature. At a low temperature metabolism reaches its highest peak in frizzle fowls. The thyroid, however, cannot maintain the requisite high level of production, and adaptations and readjustments follow. Under extreme conditions "structural disruption" may occur, leading to death.

The work affords further evidence of the profound influence of environment upon the body.—D. D. OGILVIE.

HENSCHEN, F. (1938). Kärlandotelets roll vid patologiska processer. [**The Role Played by Vascular Endothelium in Pathological Processes**].—*Skand. VetTidskr.* **28.** 393-408. 9 text figs., 5 figs. on 3 plates. [English summary].

H. gives a brief account of the role played by the reticulo-endothelial system in pathological conditions, with particular attention to the vascular endothelium. Brief mention is made of the reactive processes of the R.E.S. in pathological conditions of metabolic origin, such as disturbances of the protein, lipid or carbohydrate metabolism, and of its function in relation to the formation and destruction of the blood corpuscles, production of bile pigments, and production of antibodies.

Thrombus formation is briefly reviewed, together with the role played by the vascular endothelium; the proliferative, thrombopoietic endovascularitis as seen in processes of chronic inflammation accompanied by distended blood vessels and stagnation of the blood stream is dealt with, and endothelial tumours in general

are mentioned. In the discussion that followed HJÄRRE maintained that infectious anaemia in the horse ought to be grouped with the leucoses and endothelioses, a view which was strongly supported by the author.—GUSTAV NAERLAND (OSLO).

ERIKSSON, K. (1938). Aerftlighetsundersökningar av genital-hypoplasi hos nötkreatur. [**Investigations Respecting the Heredity of Genital Hypoplasia in Cattle**].—*Skand. VetTidskr.* 28. 419-423. 4 figs., 4 tables. [English summary].

Hypoplasia of the reproductive glands—testes of the male and ovaries of the female—causing decreased fertility or eventually total sterility occurs frequently in the Swedish highland race of cattle. The undersized condition of the glands is most frequently one-sided. In calves, especially males, the condition may be recognized shortly after birth, or in any case at puberty, whereas the females must have reached the age of 6-8 months, when rectal exploration is possible, before the exact diagnosis can be made. In 2,100 head of cattle examined, hypoplasia of the left testis or ovary was found in about 25%, of the right, in about 1%, and in both left and right, in 4-5%. 19.3% of the breeding bulls and 18.2% of the breeding cows examined were thus affected.

It is the generative tissues of the glands that are involved. The one-sided affection usually leads to decreased fertility; when it is double-sided there is total sterility. The condition is congenital and has been shown to be of a hereditary nature. A study of the mode of transmission suggested that it might be dependent on two recessive genetic factors.—GUSTAV NAERLAND (OSLO).

KEMP, T. (1938). **Heredity and the Endocrine Function. An Investigation of Hereditary Anterior Pituitary Deficiency in the Mouse.**—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 290-305. 12 figs., 3 tables. [10 refs.] [In English].

Previous work on hereditary dwarfism in mice is discussed. Using a strain of black silver mice, originally imported from England into the U.S.A. and from there to Denmark, it had been shown that a gene responsible for anterior pituitary deficiency, and so for the dwarfism, can readily be transferred to other strains of mice, and that it retains all its characters as a recessive gene. The experiments now described by K. were carried out on crosses between the old American strain and a new strain from Germany of wild mice with hereditary dwarfism. Estimation of the standard metabolism of dwarf mice showed that it was about 60% that of normal mice, a condition similar to that found in myxoedema.

The action of gonadotropic hormones on the gonads of adult male dwarf mice is described. The author used a hormone from human urine of pregnancy, which contains no gonadotropic hormone of hypophyseal type, and a hormone from pregnant mare serum, which is chiefly of the hypophyseal type. The effect of both types on testes and secondary sex organs was usually pronounced. The chorionic hormone (from human urine) acted chiefly on the testicular cells, whereas the hormone from mare serum had profound action on the seminiferous tubules as well as on the interstitial cells.—F. J. ANDREWS.

- I. COCA, A. F. (1938). **A Discussion of Food and Contact Allergies, with Special Reference to their Experimental and Possibly Natural Occurrence in Lower Animals.**—*Cornell Vet.* 28. 136-141. [1 ref.]
- II. MILKS, H. J. (1938). **The Role of Allergy in Skin Diseases of Dogs.**—*Ibid.* 142-148. [4 refs.]
- III. CORWIN, L. A., & DESSON, L. J. (1938). **General Discussion of Allergic**

**Conditions of Animals with Special Reference to Manifestations.—*Ibid.* 149-151.**

I. In an attempt to discover the cause of a canine dermatitis of unknown aetiology, the available facts of the cutaneous manifestations of anaphylaxis and allergy in man and lower animals are discussed.

The dermatitis could not be traced to a purely anaphylactic origin, nor could it be identified with the type of familial infantile eczema which is due to food sensitivity. Fagopyrism, a form of photosensitization due to various plant foods, may, however, be a causative factor. The possible relationship of the disease to the contact dermatitis of allergic origin which has been artificially induced in laboratory animals is also worthy of consideration.

II. A general survey of the phenomena of allergy revealed that certain dogs are undoubtedly sensitive to certain foods, and afford reactions manifested by urticaria and erythema.

M. describes a seasonal dermatitis of dogs occurring mostly in summer and autumn, and characterized by pruritus, with thickening and depilation of the skin of the back. It is suggested that the condition may be of allergic origin, and that the sensitizing factors dwell in the diet proteins. The possibility that external irritants may possess aetiological significance is also discussed, but no really conclusive evidence of causation is furnished.

III. In a discussion of summer eczema of dogs and its aetiology, it is suggested that unnatural environment may lead to interference with the eliminative functions, dispose to auto-intoxication, and hence create the disease. Another theory of causation is based on the supposition that most canine diets are deficient in fat, and a fat-rich diet is advocated for correction. Two unusual cases of summer eczema are described. In one, there was no recurrence of the disease after accidental poisoning with thallium sulphate. In the other, ovaro-hysterectomy for pyometritis apparently cured the condition, and acted as a prophylactic to it during subsequent seasons.—D. D. OGILVIE.

STOCKKLAUSNER. (1938). Die Zuchtschäden vom züchterischen Standpunkt betrachtet. [**Breeding Losses from the Point of View of the Breeder**].—*Dtsch. tierärztl. Wschr.* 46. 756-758.

Illness in young stock due to feeding excess protein or to mineral and vitamin deficiencies is common. Feeding the dam on acid foods will also affect the sucking young. Experimentally, mineral deficiencies are known to cause sterility, but in practice little is known regarding the significance of this factor. The practice of treating all cases of sterility with mineral supplements indiscriminately is condemned. Reports on the use of vitamin E are inconclusive; there is said to be some indication that treatment with vitamin E may influence the course of *Brucella abortus* infection, and reduce the number of abortions. Owing to lack of experimental evidence, the whole subject of diet in relation to sterility is obscured by vague theorizing.

S. studied large numbers of herd books and found that in Germany the average length of life of cows of high and low milking capacity was the same. Cows are eliminated from herds mainly on account of sterility, and the conclusion is drawn that there is no direct relation between high milking capacity and infertility.

—A. T. PHILLIPSON.

POLOVCEVA, V. V., POGINOVA, N. V., LOPYRIN, A. I., JUDOVIČ, S. S., & DIESPEROV, A. G. (1937). Příčiny jalovosti ovcí i mýry borjby a neí. [**Causes and Control of Sterility in Sheep**]. pp. 76. 84 figs., 7 tables. [Numerous refs.]

Moscow: All-Union Lenin Academy of Agricultural Sciences. [8vo]. [2s.] [English summaries].

About 6% of sheep in the U.S.S.R. are affected with sterility. The authors give the results of special investigations made on 100 ewes of improved local merino breed, 4-7 years old, which had been sterile for 2-8 years. Eight out of the 100 ewes reacted positively to various brucella tests (agglutination, complement-fixation, and allergic, and in one case *Br. melitensis* was isolated from the spleen.

P.M. examination revealed affections of the ovary in 16 ewes (atrophy in 3, cysts in 4, and oophoritis, adhesions and cicatrices in 9); there were affections of the uterus in 15 ewes (hydrometritis in 5, pyometritis in 2, and infantilism in 7, while in the case of one ewe the uterus was absent); there were affections of the fallopian tubes in 9 (hydrometritis in 1, cysts in 5, and cicatrices and occlusion of the tubes in 3); there were affections of the vagina in 25 (vaginitis in 3, abscesses in 1, cicatrization in 1, constriction in 2, tumours in 3, retention of a macerated foetus in 3, constriction in 10, and infantilism in 1, while in the case of one ewe the vagina was absent); and there were affections of the cervix in 78 (torsion and occlusion in 77, the other ewe having no cervix).

BINDEL, L. (1937). Rola owcy w patogenezie głowicy bydła. [**The Role of Sheep in the Spread of Bovine Malignant Catarrh in Poland**].—*Przegl. wet.* 52. 536-541. 1 table. [Numerous refs.]

In continuation of his earlier article [*V. B.* 8. 381.] B. reports on 44 outbreaks, 34 of which occurred on farms where cattle and sheep were habitually in direct contact. In the remaining cases an occasional transmission by contact with sheep and deer could not be excluded. Much of the paper is devoted to a review of the literature. B. emphasizes that contact with sheep appears to be an important factor in the incidence of the disease.—V. CHLÁDEK (PRAGUE).

- I. MIESSNER, H. (1938). Virusabort der Stuten. [**"Virus Abortion" in Mares**].—*Dtsch. tierärztl. Wschr.* 46. 744-745. [4 refs.]
- II. HUPBAUER, A. (1938). Beitrag zum Virusabort der Stuten. [**"Virus Abortion" in Mares**].—*Ibid.* 745-748. 1 table.
- III. OPPERMAN, T. (1938). Zur Frage des Virusabortes der Stuten. [**"Virus Abortion" in Mares**].—*Z. InfektKr. Haustiere.* 54. 106-115. 1 table. [2 refs.]

I. A recapitulation of an earlier paper [*V. B.* 8. 716]. [It is stated in the present paper that experiments on pregnant mares were carried out at the time of investigation and that the result supported the virus-causation theory, but these experiments were not reported in the earlier paper and the result of them is not described in either. See also SEDLMEIER, *V. B.* 9. 172].

II. An account of bacteriological work on equine abortion in Yugoslavia. Between 1925 and 1937, 525 cases were investigated, of which 44% were negative bacteriologically. A sudden outbreak of abortion in a stud of 70 mares occurred two weeks after they had been vaccinated against *Salmonella abortus-equi* infection. Attempts were made to demonstrate a filtrable agent in 16 of the aborted foals, using Seitz E R filtrates, which were inoculated into a total of 24 guinea pigs and two rabbits, all pregnant; 13 guinea pigs and both rabbits aborted. Three pregnant mares were also inoculated with filtrates from aborted foals and g. pigs during their tenth, seventh and third months of gestation respectively. The first foaled at full term and the foal was killed. It is stated that some disease conditions were present, but no bacteria were isolated. Seitz filtrate from its liver and spleen caused abortion in one of three pregnant g. pigs. Nothing significant for virus

abortion was found in the other two mares. This evidence is offered to support the theory that there exists a type of abortion in mares which is caused by a living filtrable virus.

III. The author carried out an investigation at the stud, where MIESSNER and HARMS had observed an outbreak of abortion [*V. B.* 8. 716.] and he continued to supervise the diet of the same mares during the next foaling year. He found that the mares had been very richly fed (natural pasture and supplementary corn, etc.) and that their blood was in a state of hyperglobulinaemia, the sublimate test being strongly positive. The serum phosphorus content and alkali reserve were also supernormal.

The diet was changed so as to reduce the protein intake and subsequently only one mare out of 20 aborted. O. therefore holds that the abortion reported first by MIESSNER and HARMS was really of dietetic origin. [The same argument might be applicable to the cases of SEDLMEIER (*V. B.* 9. 172.) and HUPBAUER (in II, p. 568)].—J. E.

MIEGEVILLE, J. (1938). Avortements par avitaminose. [**Abortion, associated with Avitaminosis in Mares**].—*Maroc méd.* 18. 387-388.

In a large stud in Morocco the mares were aborting from five months until close on term; some foals were born alive, but died within 24 hours. Possible contagious causes were eliminated. The mares were in excellent health and well fed, the ration consisting of barley and dry forage; in this particular season it had not been possible to feed oats and sugar-beet in the autumn, owing to drought. After the injection of 6 c.c. of wheat germ oil and the feeding of green oats, no further abortions occurred. The cause of the abortions was therefore diagnosed as deficiency of vitamin E. An account is given of one mare in which the premonitory symptoms (colic) of abortion ceased after the injection of wheat germ oil; subsequently a dead and deformed foal was born, the deformity being possibly caused by lack of vitamin E in the earlier embryonal stages.—N. J. SCORGIE.

PARNES, J. (1939). Przyczynę do zagadnienia ślepoty miesięcznej koni. [**Periodic Ophthalmia in Horses**].—*Wojsk. Przegl. weteryn.* 10. 33-37. [8 refs.] [French summary].

A clinical account of symptomatic treatment of equine periodic ophthalmia.

GRZYCKI, St., & GUCFA, W. (1937). Badania zmian chemicznych w mięśniach koni w czasie pracy i w myoglobinemii porażennej. [**Chemical Metabolism of Muscles of Working Horses with Reference to Myoglobinuria**].—*Przegl. wet.* 52. 521-535. 7 tables. [15 refs.]

The authors tried to induce myoglobinuria artificially in horses, giving them very rich food (8 kg. oats, unrestricted amounts of hay, and 2 kg. sugar daily). After a prolonged rest the animals were given hard work in rainy or frosty weather. After work, there was a decrease of glycogen and an increase of lactic acid in the muscles. These findings were more pronounced after a short period of work than after a long period. The authors failed to induce myoglobinuria, and concluded that other causes also play a part in producing the disease.

TACKEN, P. H. W. (1938). Een geval van abnormale pigmentatie bij een vet kalf. [**Abnormal Pigmentation in a Calf**].—*Tijdschr. Diergeneesk.* 65. 118-114. [English, French and German summaries].

Sharply outlined brown discolorations were found in the bones, lungs and liver of a fattened calf, and the skeletal muscles of the right side of the head also

had a dark brown colour. Osteohaemochromatosis was suspected. No symptoms had been noticed during life.—JAC. JANSEN (UTRECHT).

PASQUA, A. (1938). Ossificazione metaplastica del bacinetto renale in una vacca. [**Metaplastic Ossification in the Kidney of a Cow**].—*Clin. vet., Milano*. **61**. 532-538. 4 figs. on 2 plates. [19 refs.]

P. reviews previous literature on the subject of ossification, and states that he can only find reference to one such case. He describes in detail his own examination of a cow about eight years old in which the right kidney and ureter were found enormously enlarged and thickened. On section of the kidney, the medulla bounding the pelvis contained a plate of ossified connective tissue.—S. F. J. H.

MACCHIONI, I. (1936). Sulla degenerazione grassa a focolai nel fegato degli animali domestici (cosidetti "Infarti adiposi" nell'uomo). [**Fatty Degeneration of the Liver in Domestic Animals**].—*Clin. vet., Milano*. **59**. 411-421. 4 figs. [10 refs.]

M. examined a large number of livers of cattle from abattoirs for fatty degeneration, which seemed to occur in a large proportion of animals, some of which were otherwise perfectly healthy. A few cases in sheep and dogs are also mentioned. The lesions were localized on the top of the outer edge of the right hepatic lobe, invading the right lateral ligament which was increased in size. They consisted of small yellowish red spots which were never surrounded by inflammatory areas or by cicatricial tissue and which penetrated into the underlying tissue in wedges.

M. suggests that this condition is due to the mechanical movement of the ligament and the capsule over the adjacent parts of the liver provoking local circulatory disturbances which are aggravated by the pressure on the liver tissue, probably as a result of unusual exertion or unusual gastric or abdominal distension.

CUILLE, J., & CHELLE, P. L. (1938). La tremblante du mouton. Son étiologie. [**Aetiology of Scrapie**].—*Rev. Path. comp.* **38**. 1358-1372. [10 refs.]

The authors state that the majority of workers on scrapie consider that this disease is of an infectious nature, but that no aetiological agent has as yet been demonstrated [see *V. B.* **9**. 262].

The reasons for this belief are discussed, and the authors attribute the failure to reproduce the disease to two main causes, *viz* :— the use of unsuitable inoculation material, and the comparatively short duration of observation of the experimental animals as compared with the presumed long incubation period of the disease. In their own experiments extending over more than two years, they were able to produce the disease in healthy sheep from areas free of scrapie by inoculation of emulsions of the central nervous system from sheep in an advanced state of the disease. Inoculations were made into the brain, epidural space, anterior chamber of the eye, and subcutaneous conjunctival tissue, the most effective route being the intracranial. The incubation period was very variable, being never less than 11 months and in some cases almost two years. In two animals the disease was reproduced by the inoculation of filtered suspensions, indicating that the causal agent was a filtrable virus. The disease could not be transmitted under experimental conditions by cohabitation of affected and healthy sheep. Goats and rabbits were found to be resistant to inoculation, although in the latter nervous symptoms did arise after 45-75 days, which were attributed to trauma at the time of inoculation. After reviewing the evidence for the hereditary nature of the disease the authors conclude that there is nothing to support this view.

—N. J. SCORGIE

GREEN, R. G., & LARSON, C. L. (1938). **A Description of Shock Disease in the Snowshoe Hare.**—*Amer. J. Hyg.* 28. 190-212. 6 figs. on 1 plate, 3 tables. [Numerous refs.]

The periodic decimation of snowshoe hares in Minnesota was investigated by the authors with regard to symptoms, blood chemistry, pathology and bacteriology, in 31 animals dead of "shock" disease. The responsible factor is suggested to be the shock of trapping, observed in both trapped and captive hares. Symptoms in both cases, in the opinion of the authors, are due to hypoglycaemic shock resulting from liver damage, and consequent failure of glycogen storage. Six figures illustrate the abnormal histology of the livers of affected hares. A discussion of possible causative factors indicates that some toxic agent associated with a parasite may be involved.—R. O. MUIR.

MURCIANI, C. (1936). L'achondroplasia chez les animaux domestiques. [**Achondroplasia in Domestic Animals**].—*Thesis, Lyons*. pp. 58. 1 fig. [Numerous refs.]

This thesis is a general discussion on the subject of achondroplasia. It contains detailed P.M. findings in three cases of the disease in bovines, quoted from French work.

Various theories as to the aetiology of the condition are postulated. M. inclines to the theory that bacterial infection may be a possible cause. [The evidence for this seems to be very slight. The thesis contains little that is original].

—D. L. HUGHES.

LASSERRE, R., LOMBARD, C., & LARATUT, R. (1938). Recherches sur le cancer des animaux domestiques. [**Cancer in Domestic Animals**].—*Rev. Méd. vét., Toulouse*. 90. 425-451. [7 figs.]

The authors summarize the results of statistical analysis of the neoplasms encountered at the veterinary school at Toulouse during the years 1933-1937. The total number of animals examined comprised 10,139 carnivora and 1,574 horses, asses and mules.

The proportions of animals affected with neoplasms were:—dogs, 7%, cats, 1%, and solipeds, 1.6%. The corresponding figures for malignant tumours were 5.2%, 0.8% and 0.4% respectively. It will be observed that most neoplasms in carnivora were malignant. In the carnivora, the relative proportion of tumours in female and male animals was 4:1 in the dog and 16:1 in the cat. In the dog, the age at which neoplasms were most frequently observed was 6-10 years.

Details of the different types of tumours are given in the text in the form of tables and charts. Among the tumours in dogs and cats, it is very surprising to find that no neoplasms were recorded in any part of the alimentary tract, excluding the buccal cavity and anus. Several examples of multiple primary tumours are recorded.

In the dog, venereal sarcoma was extremely common, there being 20 cases affecting the penis and prepuce of the male and 83 involving the vulva and vagina of the bitch. Melanotic tumours were rare, one being found in a dog and one in a horse.—E. G. WHITE.

DIETER, R. (1938). Ueber eine primäre Multiplizität von Zungengeschwülsten beim Schwein. [**Multiple Tongue Tumours in Swine**].—*Tierärztl. Rdsch.* 44. 801-804. 1 fig.

Numerous nodules of various sizes, some as large as a pea, which were covered by intact squamous and often atrophic epithelium were found on the tongue,

epiglottis, tonsils and pharynx of an otherwise healthy pig carcass. Nodules were also present in the substance of the tongue and in the muscular tissues surrounding the pharynx. In all regions the nodules were infiltrated with occasional eosinophile leucocytes; lymphocytes were absent. The histological structure of some of the lesions was suggestive of a squamous epithelioma; others suggested a spindle cell sarcoma, and various intermediate grades were observed. The neoplasms in this pig are regarded as primary multiple sarcomata of varying degrees of differentiation.

—E. G. WHITE.

DAVIS, D. J. (1938). **Goiter and Malignant Growth of the Thyroid in the Dog.** —*Arch. Path.* **26**. 339-347. 7 figs. [3 refs.]

Over a period of years, dogs with enlarged thyroid glands were selected from the large number of animals used for research purposes. In all, 26 cases were studied, most of the animals coming from the region of the Great Lakes, where goitre is common among the human population. The largest thyroid measured  $12 \times 9 \times 4$  cm. and most of them were at least  $7 \times 5 \times 2$  cm. In eight animals there were pulmonary metastases; secondary growths were not found in any other organs, with the exception in one case of a small nodule in the right auricle 1 cm. above the tricuspid valve. Although vascular dissemination to the lungs was common, in only one case were the regional lymph nodes of the primary site affected. The finding of aberrant thyroid tissue in the periaortic fat, previously recorded on numerous occasions, is mentioned. No references to veterinary literature dealing with benign or malignant hyperplasia of the thyroid are given.

—E. G. WHITE.

- I. FRITZSCHE, K. (1937). Versuche zur Erforschung und Bekämpfung der Marek'schen Hühnerlähme. — II. Versuche über die Brauchbarkeit des Präparates Therapie zur Bekämpfung der Hühnerlähme. III. Schutzimpfungsversuch mit einer Formolvakzine. [Fowl Paralysis. II. Treatment. III. Vaccination Experiments with Formol Vaccine].—*Z. InfektKr. Haustiere*. **52**. 124-127. [6 refs.] [See also *V. B.* **8**. 720].
- II. FRITZSCHE, K. (1938). Beobachtungen über den Verlauf und die Bekämpfung der Marek'schen Hühnerlähme in überwachten Geflügelzuchten. [The Control of Fowl Paralysis in Supervised Poultry Farms].—*Berl. tierärztl. Wschr.* April 1st. 181-184. [6 refs.]

I. "Therapeksi" was found to be useless in the control of F.P. A formol-vaccine was used but it did not produce immunity. The author considers it unlikely that an effective curative or preventive agent will be found.

II. The author describes the course and control of F.P. on nine poultry farms. Hygienic and special breeding measures were adopted and the disease was controlled; this was considered to be evidence that the disease is of an infectious nature. Hens two years old or more were found to be no longer susceptible to the disease, and it was found that by breeding from birds 2-3 years old it was kept in control. The incidence of infection can also be considerably reduced by complete isolation during breeding, young birds being separated from the rest of the flock for about 15 weeks. Twelve-week-old pullets were found to be the most susceptible to infection.—SASSENHOFF (MUNICH).

- JUNGHERR, E., & LANDAUER, W. (1938). **Studies on Fowl Paralysis. 3. A Condition Resembling Osteopetrosis (Marble Bone) in the Common Fowl.**—*Bull. Storrs agric. Exp. Sta.* No. 222. pp. 84. 31 figs. on 8 plates, 3 tables. [Numerous refs.] [See also *V. B.* **8**. 458].

An outbreak of osteopetrosis is described in a breeding flock of 2,000 birds

kept for purposes of genetic research. About 80 birds were affected in 1933, and 40 in 1934. Males and females appeared to be equally susceptible. The symptoms, gross pathology and histopathology are described in detail. The disease could be transmitted by inoculating chicks under a week old with heparinized whole blood or suspensions of bone-marrow from certain affected cases.

Practically all the natural cases of osteopetrosis had also lesions of lymphomatosis, and osteopetrosis could be set up by inoculating lymphocytic tumour material from them. The gross deformities seen in spontaneous cases of osteopetrosis were never reproduced experimentally. Lymphomatosis occurred in 47.5% of the inoculated chicks, compared with 2.5% in the controls. It was impossible to obtain a strain of osteopetrosis which did not also produce lymphomatosis, and the authors concluded that the transmissible agent embodies both osteogenetic and lymphogenetic properties. This agent, which was ultramicroscopic and cell-free, could withstand desiccation for 105 days.

A review of the literature on avian osteopathies is included.—J. E. WILSON.

## NUTRITION IN RELATION TO DISEASE

VOEGEL, H. (1938). Acétonémie et hémoglobininémie puerpérale chez la vache. [**Puerperal Acetonaemia and Haemoglobinaemia in Cows**].—*Thesis, Alfort*. pp. 74. [Numerous refs.]

These two diseases are considered together because there are many similarities between them. They are both found in northern countries or in mountainous regions where the winters are long and severe, and occur in the winter in heavy milkers, 1-3 weeks after parturition. Both are accompanied by digestive disturbances; acetone always being produced in excess in the first, whilst in the second, haemoglobinuria is often accompanied by acetonuria. On P.M. examination, degenerative changes are found in the liver and kidneys, being most marked in the latter in the loops of Henle.

The acetonaemia is divided into a chronic type and a subacute type accompanied by nervous symptoms. The most important predisposing causes are a long winter, a deep milking breed and a concentrated diet. Although many theories are quoted, nothing is known regarding aetiology beyond the facts that ketone bodies are present in the blood in excess and that a pronounced hypoglycaemia occurs. Consequently the best treatment appears to be the administration of glucose and alkalis.

Haemoglobinaemia occurs in cattle five to eight years old, and has a sudden onset; the death rate is given as 70%. The aetiology of this condition is equally obscure; dry conditions favour its occurrence, poorly fed and well fed animals are equally susceptible. No satisfactory treatment is known.—A. T. P.

PATTERSON, J. B. E. (1938). **Some Observations on a Disease of Sheep on Dartmoor**.—*Emp. J. exp. Agric.* 6. 262-267. 3 tables. [Numerous refs.]

A disease of Dartmoor sheep on upland pasture is described. The condition closely resembles "pine" in Scotland and "bush sickness" in New Zealand. In P.'s experiments, Welsh breeds were particularly susceptible, but Shetland sheep appeared to be immune. The disease is characterized by progressive emaciation and weakness, but rapid recovery follows transfer to lowland grazings.

The climatic, topographical, and soil conditions of the affected areas were investigated, and the amounts of available iron and cobalt were determined. It was found that, whereas healthy soils contained on the average 19.6 p.p.m. of

cobalt, unhealthy soils contained only 4 p.p.m. A preliminary trial with mineral supplements was carried out. Twelve lambs with characteristic symptoms of the disease were fed a daily ration of cake supplemented by 7 mg. cobalt chloride, 14 mg. manganese sulphate, and 1.365 g. zinc sulphate per head per week. Another 12 lambs were maintained as controls, receiving the cake, but not the minerals. The experimental group recovered first, and thereafter appeared more healthy, but at the end of two months both groups were of equal live weight.

Although the work had to be abandoned on account of the cost before a full trial was possible, it is considered likely that mineral supplements of cobalt, manganese, and zinc will be effective in controlling the disease.—D. D. OGILVIE.

MCGOWAN, J. P. (1939). **Copper and Cobalt in Iron-Deficiency Anaemias.** [Correspondence].—*Brit. med. j.* Feb. 11th. 297.

The author discusses the view that too much attention has been given to the part played by Co and Cu in the physiology of haemoglobin formation. The curing of nutritional anaemias such as "bush sickness", "pine", etc., he still attributes solely to the administration of Fe, citing various recent references, and generally pours scorn upon the association of the "trace elements" with various plant and animal deficiency diseases.

[In view of the immense literature that has accumulated around this subject in recent years, much of which has been abstracted in this *Bulletin*, it is unnecessary to attempt a criticism of what is a minority view and a personal outlook. Although some of the literature quoted may appear to lend support to this view, reference to the original shows that McGowan is inferring more from the data contained therein than the authors either intended or themselves believed].—ALFRED EDEN.

DOLS, M. J. L., JANSEN, B. C. P., SIZOO, G. J., & VAN DER MAAS, G. J. (1938). **Distribution of Phosphorus in the Leg Bones of Chickens.**—*Nature, Lond.* 142. 953-954. [2 refs.]

Following injection of a radio-active P salt into normal and rachitic chickens which were killed off after 22 hours for examination of the leg bones, it appears, from radio-active measurements and from radiographs, that P metabolism is more intense in the bone of rachitic chickens than in that of normal chickens. P metabolism is also more intensive in the epiphyseal than in the diaphyseal part of the same bone.—ALFRED EDEN.

I. GALLUP, W. D., & NORRIS, L. C. (1939). **The Amount of Manganese Required to Prevent Perosis in the Chick.**—*Poult. Sci.* 18. 76-82. 4 tables. [17 refs.]

II. GALLUP, W. D., & NORRIS, L. C. (1939). **The Effect of a Deficiency of Manganese in the Diet of the Hen.**—*Ibid.* 83-88. 4 tables. [12 refs.]

I. Experiments on perosis, a nutritional disease involving deficiency of Mn, indicated that the amount of Mn required in the diet to prevent the disease in New Hampshire chicks is 50 p.p.m. Amounts of Mn up to 1,000 p.p.m. in food or drinking water were ineffective in preventing cases of perosis which developed early, indicating that the disease in its early stages appeared during the embryonic development of the chicks. Other results suggest breed and strain differences in susceptibility to perosis and in Mn requirements.

II. The Mn content of eggs was proportionately increased by feeding hens on known quantities of Mn (13-1,000 p.p.m.). Deficiency of Mn led to low egg production, high mortality of embryos, usually during the final stages of incubation, and slightly decreased fertility. Chicks hatched from eggs of low Mn content,

with low initial Mn reserves, showed no increase in susceptibility to perosis, and the prevention of this disease seems to be more dependent on the actual Mn intake in the food than the actual Mn reserves.—ALFRED EDEN.

SALGUES, R. (1938). La minéralisation de la plume au cours de l'ostéomalacie. [**Mineral Content of Feathers of Ducks with Osteomalacia**].—*C. R. Soc. Biol. Paris*. **129**. 751-753. 1 table. [1 ref.]

From analyses of the ash of feathers of normal and osteomalacic ducks for Ca, P, Mg, and CO<sub>2</sub> (carbonate) it was concluded that the principal Ca-P compound of feathers is not Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> (as in bone) and that the composition of feather ash, moderately constant in normal birds, varies considerably during the course of the disease. Comparatively it would appear that the activity of the H<sub>2</sub>PO<sub>4</sub>' ion, in a biological medium, is greater than that of the PO<sub>4</sub>' ion for normal birds, while the reverse holds true for osteomalacic subjects.—ALFRED EDEN.

- I. GUILBERT, H. R., & HART, G. H. (1935). **Minimum Vitamin A Requirements with Particular Reference to Cattle**.—*J. Nutrit.* **10**. 409-427. 3 tables. [Numerous refs.]
- II. GUILBERT, H. R., MILLER, R. F., & HUGHES, E. H. (1937). **The Minimum Vitamin A and Carotene Requirements of Cattle, Sheep and Swine**.—*Ibid.* **13**. 543-564. 4 tables. [18 refs.]
- III. SEN, K. C., & SESHAN, P. A. (1938). **The Problem of Vitamin-A Deficiency in the Diet of Farm Animals**.—*Indian J. vet. Sci.* **8**. 169-182. [Numerous refs.]
- IV. MCNUTT, S. H., & WALL, J. F. (1938). **Nutritional Blindness in Steers**.—*Vet. Med.* **33**. 497-499. 1 fig. [7 refs.]
- V. MOORE, L. A. (1938). **Relationship between Carotene, Blindness Due to Constriction of the Optic Nerve, Papillary Oedema and Night Blindness in Calves**.—*J. Dairy Sci.* **21**. 114.
- VI. STEWART, J., & MCCALLUM, Jennie W. (1938). **The Vitamin A Content of the Colostrum of Dairy Cows**.—*J. agric. Sci.* **28**. 428-436. 2 figs., 1 table. [5 refs.]
- VII. IRVING, J. T., & RICHARDS, Marion B. (1938). **Early Lesions of Vitamin A Deficiency**.—*J. Physiol.* **94**. 307-321. 1 plate, 2 tables. [8 refs.]

I. The total storage of vitamin A and carotene in the liver and body fat of cows, 2-18 years old, which had had access to abundant green feed throughout life, was estimated to be about 0.6-0.7 g. in the younger animals and up to 3.6 g. in aged cows. The liver stored 67-93% in the form of vitamin A, while carotene predominated in the fat. The first detectable clinical symptom of vitamin A-deficiency was night blindness followed by nervous symptoms, convulsive seizures and total blindness. The daily minimum carotene requirement of the bovine was found to be 26-38γ per kg. live weight; 29γ per kg. daily prevented or cured clinical symptoms and promoted normal weight increases, but resulted in no storage. The hypothesis is advocated that vitamin A requirement is related to body weight rather than to energy requirement. For chickens and turkeys, the requirement was considerably higher than that of the mammals studied.

II. The minimum daily carotene and vitamin A requirements per kg. body weight were found to be 25-30γ for cattle and 6-8γ for sheep and swine. These figures agree with similar data on the rat. The night blindness test, supplemented by a check on storage, either by depletion or by the antimony trichloride

test on extracts of the liver tissue, was used as the criterion of sufficiency. The data are used to substantiate the hypothesis proposed in I. Observations on reproduction during the experimental period and data on depletion periods for swine and sheep are presented and discussed.

III. This paper consists of a general review of avitaminosis-A in so far as it relates to the practical feeding of farm animals. The carotene contents of various stock feeds and the requirements of vitamin A for the proper maintenance of the health of livestock are discussed. The provision of suitable green feeds and pasture lands as the only practical method of supplying the carotene requirement of farm animals is emphasized, also the importance of preserving the vitamin A potency of green plants when converted into hay or silage. The existence of avitaminosis-A in a mild form under the ordinary conditions of stock feeding in India and the need of rectifying this condition are also considered.

IV. Ninety steers fed a grain mixture of yellow corn 10 parts, oats and barley 3 parts, and a commercial protein concentrate 0.75 part, with oat straw as roughage, became affected with blindness after disturbances manifesting loss of appetite, a dry scabby nose and discharge from the nostrils, followed in some cases by diarrhoea. Apart from blindness or impaired sight no symptoms appeared between attacks, and in the six months during which this ration was fed, an average daily gain of nearly 2 lb. was recorded. P.M. examination of two blind animals showed that the lesions were confined to the optic nerve, in which microscopic examination revealed complete destruction of the fibres. It is submitted that this type of blindness is due to some nutritional factor.

V. A brief report is given of the relationship between vitamin A-deficiency and the occurrence of blindness, papillary oedema and night blindness in calves and cows. Mature cows on a vitamin A-deficient diet developed night blindness and papillary oedema, but blindness due to constriction of the optic nerve occurred only in calves, as in the latter the optic canal is not yet well calcified and is still growing in length. Further work with calves showed that the blindness was preceded by papillary oedema and generally by night blindness.

VI. The vitamin A content of the colostrum of 100 stall-fed cows kept under the same conditions of dieting and management was found to range from 1,181 to 35 international units per 100 c.c. This wide range was not due to any differences in diet, breed, or date of calving, but it is suggested that the vitamin A content of the colostrum, which is assumed to depend directly on the liver reserves, may be materially affected by the length of the non-lactating period between successive calvings, since the longer the non-lactating period the less would be the depletion of the liver.

VII. Rats placed on a vitamin A-free diet at weaning developed degeneration of the funiculus praedorsalis at the level of the pyramidal decussation at an early age. When compared with the variability in pathological condition met with in other parts of the body, the uniformity of this degeneration found in the medulla suggests that this is one of the fundamental lesions of vitamin A-deficiency. No lesions were found in the medullas of animals which received the vitamin A-free diet with the daily addition of adequate amounts of carotene or vitamin A. In female rats, degeneration in the medulla became evident later than in males, while animals which were denied access to the mother's diet before weaning developed lesions earlier than those not so debarred. In many cases, well marked lesions were found in animals still increasing in weight and in apparently good health. The possibility of toxins in cereals causing the nerve lesions was eliminated, since the same lesions were found in animals on a vitamin A-free diet which contained no cereals.—R. ALLCROFT.

- I. GALVÃO, P. E. (1938). Ueber die Wirkung des Vitaminkomplexes B auf den gesamten Stoffwechsel beim experimentellen Beriberi. [**The Action of Vitamin B Complex on Metabolism in Experimental Beriberi**].—*Pflüg. Arch. ges. Physiol.* **239**. 131-135. 2 tables. [2 refs.]
  - II. ABDERHALDEN, E. (1938). Beitrag zum Problem der für die B<sub>1</sub>- (Aneurin bzw. Thiamin-) Avitaminose charakteristischen Erscheinungen. [**Characteristic Symptoms of B<sub>1</sub>- (Aneurin, Thiamin-) Avitaminosis**].—*Ibid.* **240**. 647-652. 2 tables. [5 refs.]
    - I. Pigeons with vitamin B-deficiency are affected with anorexia, which results in a slowing down in body metabolism and a fall in temperature; a rise in the metabolic rate and temperature can be brought about by the administration of vitamin B. The author suggests that the vitamin acts on the residue of food in the digestive canal, producing more energy and causing the rise noted above.
    - II. A. disagrees with GALVÃO [in I, above], and reports experiments by which he proved that the rise in temperature followed the administration of vitamin B even though the digestive tract was quite free of food. A. further reports that the convulsions of severe beriberi in pigeons occur much earlier in those fed on polished rice plus sugar than in those on polished rice alone.—J. E.
  - I. ABDERHALDEN, E., & ABDERHALDEN, R. (1938). Das Verhalten des Dünndarmes von an den Folgen der B<sub>1</sub>-Avitaminosis leidenden Tauben gegenüber Acetylcholin. Einfluss von Vitamin B<sub>1</sub> (Aneurin, Thiamin) auf die Acetylcholinwirkung. [**Action of Acetylcholine on the Small Intestine of Pigeons with B<sub>1</sub>-Avitaminosis. Influence of Vitamin B<sub>1</sub> (Aneurin, Thiamin) on the Action of Acetylcholine**].—*Pflüg. Arch. ges. Physiol.* **240**. 388-392. 5 tables. [3 refs.]
  - II. ABDERHALDEN, E., & ABDERHALDEN, R. (1938). Die Heilung der B<sub>1</sub> Avitaminose bei der Taube durch Zufuhr von Thiazol- und Pyrimidinkomponente des Aneurins. [**Treatment of B<sub>1</sub>-Avitaminosis in Pigeons by Thiazol and Pyrimidin Components of Aneurin**].—*Ibid.* 746-752. [3 refs.]
    - I. The authors found that the small intestine of pigeons on a diet of polished rice (deficient in vitamin B<sub>1</sub>) had lost the capacity for contraction on dosing with acetylcholine which always occurred in that of pigeons on a normal diet. A recovery of the acetylcholine tone was obtained by the administration of aneurin to the test pigeons. Aneurin itself has no stimulating action on the intestine.
    - II. It was found that beriberi in pigeons was curable equally well by aneurin or by two of its constituent parts (4-methyl-5-hydroxyethyl-thiazol and 2-methyl-4-amino-5-bromomethyl-pyrimidinhydrobromide or 2-methyl-4-amino-5-oxy-methylpyrimidin). These components acted rapidly when both were given simultaneously by the same route, but more slowly when given by different routes.—J. E.
- GREGOIRE, C. (1938). La vitamine C et la maladie de Barlow chez le chien. [**Vitamin C and Scurvy in Dogs**].—*Ann. Méd. vét.* **83**. 366-371. 2 graphs.
- Using the dichlorophenol-indophenol indicator test, G. estimated that the urine of healthy dogs contained 25-30 mg. of ascorbic acid per litre. It was possible to raise the level to 140-150 mg. by oral administration of ascorbic acid. A syndrome is described characterized by rachitism, and pain on handling or on pressure of the leg bones (due to sub-periosteal haemorrhage), and only 2-5 mg. ascorbic acid per litre of urine. Administration of lemon juice in most cases restored the urinary ascorbic acid to normal levels and resulted in amelioration of symptoms. A certain number of cases did not respond to this treatment, possibly owing to a dysfunction in body utilization of ascorbic acid.—N. J. SCORGIE.

LE HÉNAFF, N. (1938). *Comparison entre la valeur antiscorbutique du lait de vache frais et celle des laits pasteurisés. [Comparative Value of Fresh and Pasteurized Milk against Scurvy].—Thesis, Alfort.* pp. 84. [Num. refs.]

The author carried out clinical and biological studies on the vitamin C content of various types of raw and pasteurized milk. He found the ascorbic acid content of commercial raw milk to be very low, owing to the oxidation processes which occur in the handling of the milk. When freshly drawn from the udder, milk was found to contain 1.65-1.98 mg. % of ascorbic acid, as against 0.72 mg. % for the commercial samples. After pasteurization at 80° or 90°C. the milk had mean values of 1.22 mg. % and 1.88 mg. % respectively, *i.e.*, values only slightly lower than those of the freshly drawn raw milk. Boiling at 120°C. for 25 minutes appeared to destroy the antiscorbutic factor completely.—N. J. SCORGIE.

KRAUSS, W. E., & BETHKE, R. M. (1936). *Anti-Rachitic Cow's Milk.—Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm. 1932-1935.* pp. 256-259. 2 tables.

Six Holstein cows were divided into two groups. All cows received the same winter ration, but one group received, in addition, sufficient irradiated yeast to give 55 Steenbock rat units per quart of milk. The milk from the other group was irradiated. Samples of milk and butter-fat from both groups were tested on rachitic rats, and appeared equal in curative properties. The prophylactic assay of the butter-fat, however, showed that the irradiated milk was more potent, 40 mg. of the irradiated fat being equal to 60 mg. of the butter-fat from milk from yeast-fed cows.—H. E. BYWATER.

— (1936). *Report of Special Committee on Vitamin D Milks [Amer. Ass. Med. Milk Comm.].—Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm. 1932-1935.* pp. 251-256.

There are three types of antirachitic milk sold in U.S.A., *viz*, certified vitamin D milk, produced by feeding yeast to cows, and containing not less than 150 Steenbock units per quart, milk fortified with cod-liver oil concentrate and having not less than 150 Steenbock units per quart, and irradiated milk having not less than 55 Steenbock units per quart.

Clinical tests show that, unit for unit, milk fortified with cod-liver oil concentrate is apparently less effective in preventing rickets than vitamin D milk produced either by feeding yeast or by direct irradiation.

Suggestions were made for securing the recognition of certified vitamin D milk and for determining the antirachitic values of irradiated and "yeast-fed" milk.—H. E. BYWATER.

BARRIE, Mary M. O. (1938). *The Effect of Vitamin E Deficiency on the Rat. I. Duration of Gestation. II. Lactation. III. Fertility in the Female. —Biochem. J. 32. 1467-1478, 1474-1478 and 2134-2137. 2 figs., 9 tables. [Numerous refs.]*

I. The length of gestation in the rat partially deficient in vitamin E was shown to bear an inverse relationship to the amount of vitamin E in the diet. Such partially deficient animals were unable to develop all the ova implanted, with the result that some of the foetuses were resorbed *in utero*. B. thinks that the prolongation of gestation caused by vitamin E-deficiency is due to the fact that the resorption of some of the foetuses delays the development of the others, and that this condition is an indirect effect, through the ovary, of anterior pituitary deficiency.

II. Although the total amount of milk secreted by the dams seemed adequate, the young of vitamin E-deficient rats developed paralysis and died unless given an adequate supplement of the vitamin. It is suggested that this paralysis is probably connected in some way with failure of the function of the anterior pituitary.

III. Discoloration of the uterus in vitamin E-deficient rats is described. Prolonged vitamin E-deficiency caused fibrosis of the uterine muscle, and a number of animals developed fibromyomata of the uterus. If the deficiency was allowed to proceed to advanced uterine degeneration, absolute sterility was produced.  
—R. ALLCROFT.

## PUBLIC HEALTH

LOCKE, R. C. (1937). **Rapid Detection of B. tuberculosis in Milk.**—*Vet. Rec.* **49**, 824-828. 3 tables. [1 ref.]

L. enlarges on the clinical aspect of the cases in a series reported by MAITLAND [*V. B.* **7**, 633]. He confirms the value of the method employed by her in examining milk for TB.—H. E. BYWATER.

MEDLOCK, F. W. (1937). **Clinical Examination of Dairy Herds.**—*Vet. Rec.* **49**, 881-888.

M. is convinced that swabbing an animal's throat by mechanical means for the collection of material for examination for the presence of tubercle bacilli is an inferior method, and suggests that the best way is to collect sputum on a flat surface after making the cow cough. He states that a very large number of uterine swabs from suspected cows reveal the presence of tuberculosis. Clinical examinations of dairy herds cannot be regarded as a method of eradicating TB., but are a means of disseminating knowledge amongst stock owners.

Prior to periodical clinical examinations in Essex, the incidence of TB. in bulk milk was 12%, but after one year (three examinations *per annum*) this figure dropped to 4%. M. emphasizes the great importance, as a check on the clinical examination, of biological examination of a representative herd sample of milk, taken immediately after clinical examination, but excluding milk from any animal under suspicion. Samples from suspected animals are tested individually.

—H. E. BYWATER.

THOMAS, J. J. (1936). **Report of the Committee on Methods and Standards.**—*Proc. 25th-29th Conf. Amer. Ass. Med. Milk Comm. 1932-1935*. pp. 271-276.

The Producers' Committee submitted to the conference recommendations for the revision of methods and standards for milk production. It was agreed that cattle producing certified milk should be tested for brucellosis, and that reactors should be removed immediately from such herds. Herds having reactors should be retested at intervals of not more than 30 days. All cows admitted to herds should also be retested within the same period.

It was also agreed that employees should be medically examined once a year and that, in the event of communicable disease occurring on the farm, the affected persons should be removed from the farm or be efficiently isolated.

It was suggested, but not agreed, that the bacterial count for certified milk should be reduced from 10,000 to 5,000 per c.c. It was alleged that methods used in examinations for bacterial counts lacked uniformity.—H. E. BYWATER.

FERGUSON, R. R. (1936). **Prevention of Pathologic Infections on Certified Farms.**—*Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm. 1932-1935.* pp. 327-339.

As a result of work instigated some years ago by the Chicago Medical Society Milk Commission, it is now possible, by classification of streptococci according to the classical methods, to trace the cow or human being responsible for infecting the milk supply.

Employees on certified farms supplying milk to Chicago are now tested for susceptibility to diphtheria and scarlet fever (by the Schick and Dick tests), and positive reactors are given protective inoculations.—H. E. BYWATER.

RIEDEL. (1938). **Lebensmittelüberwachung in den Heeren der Kulturstaaen. [Food Inspection in the Armies of Different Countries].**—*Z. Veterinärk.* **50.** 289-325. [Numerous refs.]

The article in a general review of what information R. has been able to obtain from the literature. As in the case of certain countries at least, the procedure followed has not been published, much of the review is incomplete. He describes in considerable detail what he has found to be the practice in many countries, and gives a good account of the system in Germany.—M. F. BENJAMIN.

- I. ZEINERT. (1938). Bericht des bakteriologischen und biologischen Laboratoriums des Städt. Schlachthofes Königsberg (Pr.), für das Jahr 1936. **[Report of the Bacteriological and Biological Laboratory of the Königsberg Abattoir].**—*Z. Fleisch- u. Milchhyg.* **48.** 252-254. 5 tables.
- II. HENNEBERG, O. H. (1938). Fleischbeschau und Lebensmittelkontrolle in Oesterreich nach der Wiedervereinigung mit dem Reiche. **[Meat Inspection and Food Control in Austria after Union with the German Reich].**—*Ibid.* 341-348.

I. During 1936, 649 samples of meat were submitted to bacteriological inspection. In 18 cases, organisms of the paratyphoid group were isolated, (*Salmonella enteritidis* in 14, *S. typhi-murium* in one, *S. paratyphi* B in two, and an unidentified strain in one), from cases of emergency slaughter (colic in horses, peritonitis, pneumonia and mastitis in cattle, and liver necrosis and icterus in calves). 130 milk samples were examined and 14.6% were found to contain more than 400,000 organisms per c.c.

II. H. states that, previous to the union with the German Reich, food control in Austria was not as efficient as that practised in Germany. All the German regulations relating to food inspection have now been enforced in Austria, and he welcomes the institution of State veterinary laboratories attached to the abattoirs.—M. F. BENJAMIN.

- I. KLIMMECK. (1937). Eine grosse bakterielle Lebensmittelvergiftung und ihre Lehren. **[An Extensive Outbreak of Meat Poisoning].**—*Berl. tierärztl. Wschr.* July 23rd. 465-469, and 478-481.
- II. KATHE. (1937). Lebensmittelinfektionen durch besondere Erreger. **[The Causes of Food Poisoning].**—*Zlb. Bakt. I. (Orig.).* **140.** 71\*-74\*.

I. This is a report on an epidemic of meat poisoning in Silesia in 1936, in consequence of which 382 people fell ill and three died. The cause was horse meat consumed minced or as sausage meat, and investigation revealed that two horses had been slaughtered, one of which was the source of infection. One was a foal, which had suffered from a fracture of the head of the femur over a long period and latterly from enteritis. The foal meat was passed as fit for consumption

since no pathological changes could be discovered, but persons eating it were poisoned. Infection of the foal's carcass was traced to its having been hung in close contact with the other (infected) carcass in the same refrigerator, instead of being separated until the examination was completed. The infecting organism was *Salmonella typhi-murium*.

II. K. states that certain saprophytes, notably *Proteus vulgaris*, *Bacterium coli* and *Bacillus subtilis*, can cause food poisoning when food has been stored in unclean surroundings or manufactured without necessary care. Milk products, especially cheese, have also caused poisoning when contaminated by certain types of *Bact. coli*; K. describes three such epidemics due to a haemolytic *Bact. coli*, in which the blood of affected persons contained agglutinins for this organism. The organism was lethal in 4-8 days to mice fed on the contaminated cheese.

—M. F. BENJAMIN.

STOCK, P. G. (1938). **The Utilization of Lethal Gases in Hygiene.**—*Proc. R. Soc. Med.* **31**. 427-442. 5 figs. [Numerous refs.]

An account is given of the uses of lethal gases in the practice of hygiene. Amongst the uses mentioned are the destruction of pathogenic organisms, rodents, insects which spread disease, insect pests (including agricultural pests) and those associated with stored foodstuffs, and also the disinfection of water or partial disinfection of sewage effluents.

Details are given of the methods of application of hydrogen cyanide, the oxides of sulphur, heavy naphtha, and of a mixture of cyanogen chloride and hydrogen cyanide. S. points out that not only does the "vacuum method" of fumigation secure better and quicker penetration, but that also the de-oxidation which occurs lowers the resistance of insects. Sulphur dioxide is stated to be a good insecticide but to have little effect on the eggs.

Other substances mentioned are chloropicrin (which destroys the eggs and larvae of most insects), ethylene chloride, ethylene oxide, carbon tetrachloride, tetrachlorethane, and the newer forms of thiocyanates. S. considers it too early to say whether or not it is possible to uphold the claims that the last-named are not lethal to human beings.—H. V. HUGHES.

## THERAPEUTICS

HORNBY, H. E. (1938). **Further Notes on Treatment of Trypanosomiasis with Particular Reference to Use of Surfen C.**—*Rep. Dep. vet. Sci. Tanganyika, 1937*. pp. 27-88. 1 table. [See also *V. B.* **5**. 478].

The relative values of tartar emetic and three Bayer products, *viz.* Surfen C, Surfen C(T) and antimosan, as trypanocidal agents are discussed on the result of the treatment of some fifty bovine cases of trypanosomiasis. H. concludes that:—"the effect on the body of Surfen C given intravenously is too severe to warrant its use by laymen, though it may be justifiably used by veterinarians. On the other hand Surfen C given intramuscularly is safe, and probably as effective as when given intravenously. The expectation of cure after a single injection of Surfen C is higher than after a course of five injections of tartar emetic or antimosan".

—S. A. EVANS.

MEYER, J. R. (1938). **Tratamento des sarnas dos animais pelo timbó. [The Treatment of Mange in Animals by Means of Timbo].**—*Biologico.* **4**. 257-261. 2 figs. [Copied *verbatim* from *Rev. appl. Ent.* **27**. 41].

In experiments in Brazil, the author found that extracts of timbo [*Loncho-*

*carpus*], which contain rotenone, are effective against mites causing mange in various animals. Small animals are best treated by an ointment made by mixing the ether extract with lard or vaseline, and larger ones by a liquid consisting of an extract in alcohol. In both cases, frequent applications are required, and if the liquid fails to give control, supplementary treatment with the ointment is necessary.

PETROV, A. M. (1937). Dostiženija v borjbe s geljmintozami pušnyh zverei. [**Helminthological Work with Fur Animals: Crenosoma Infestation**].---*Sovyet. Vet.* Nos. 11-12. pp. 31-36.

An account of experiments on 328 *crenosoma*-infested foxes, divided into six groups. Five groups were given two intratracheal injections at intervals of 2-3 days with a watery solution of iodine (1:1,500), in doses of 1, 2, 3, 4 and 5 c.c. respectively, the animals lying on their backs; the sixth group remained untreated. All the animals were killed and examined 2-10 days after treatment. In the untreated group there was an average infestation of 61 *crenosoma*, and this number was taken as an average of initial infestation in all the animals, the effectiveness of the treatment being calculated on this basis. The best results were obtained in the third group, injected with 3 c.c.; 23 out of the 56 animals were completely free of infestation, and the average effectiveness of the treatment was 80%. However, as five animals from the fourth and fifth groups died from the effects of the treatment, the authors suggest that 1-2 c.c. is a safer dose (effectiveness 72% and 76% respectively).

MERZDORF, G. (1937). Versuche mit Prolan in Oel bei Sterilität und Nymphomanie. [**Treatment of Sterility and Nymphomania with Prolan in Oil**].—*Inaug. Diss., Hanover.* pp. 58. [Numerous refs.]

In trials on a few cows with ovarian insufficiency, persistent corpus luteum and ovarian cysts respectively, it was found that oily suspensions of prolant (anterior pituitary hormone) were more active than watery suspensions.—A. W. M.

## PHYSIOLOGY

REIHART, O. F. (1939). **Chemical Studies of the Blood of Normal Cows.**—*J. Amer. vet. med. Ass.* **94**. 33-34. 2 tables. [10 refs.]

Blood from 60 lactating and 20 non-lactating cows and heifers was analysed for sugar, non-protein N, urea N, preformed creatinine, uric acid, cholesterol and chloride, and the serum for Ca, Mg, inorganic P, Na and K. Although full details are not given, the average figure and standard deviation of the mean for each constituent are shown. Generally the variations are within normal limits, but samples taken two hours before and after milking and at milking time showed that serum Na was lower in lactating cows but was generally increased during milking. Milking also caused the blood cholesterol content to rise and the chloride to fall, this tendency manifesting itself at the time of milking and continuing for two hours after.—ALFRED EDEN.

SABOVLJEV, A. (1938). Prilog izučavanju frakcija kalcijuma, kalijuma i fosfora u krvnom serumu domaćih životinja. [**The Blood Serum Ca, K, and P in Domestic Animals**].—*Vet. Arhiv.* **8**. 573-591. 11 tables. [Numerous refs.] [German summary].

The Ca, K, and P contents of the blood serum were estimated by means of the ultrafiltration and absorption method, titration of Ca and K being according

to the method of KRAMER and TISDALE, and of P according to that of BENEDICT. Both diffusible and non-diffusible Ca and K are met with in the blood serum, while P occurs only in a diffusible state. The following values for blood serum Ca were recorded in healthy animals :— in fowls, 13.65 mg. %; in horses, 11.87 mg. %; in cattle, 9.94 mg. %; and in cats, 9.6 mg. %, but the values found for the ionized Ca with the methods used are unreliable and were inconstant. P. was found as follows :— in fowls, 5.46 mg. %; in horses, 6.64 mg. %; in cats, 7.09 mg. %; in dogs, 8.6 mg. %; in cattle, 9.66 mg. %; in pigs, 10.65 mg. %, and in lambs, 11.94 mg. %. K content was found to be :— in cattle, 28.75 mg. %, in cats, 31.37 mg. %, and in fowls, 31.06 mg. %. [The figures determined for P in serum will not be reliable].—B. OSWALD (KRIŽEVCI).

FEDOTOV, A. I. (1937). Cerebrospinalnaja zidkostj pošadi. [The Cerebrospinal Fluid of the Horse].—*Sborn. Rab. Leningrad. vet. Inst. 1937.* pp. 263-273. 4 figs. [18 refs.] [German summary].

Cerebrospinal fluid was obtained from 128 horses, by one or more of three different methods :— (1) sub-occipital puncture, (2) cervical puncture between the atlas and axis, and (3) lumbar puncture. F. suggests that the second method is much easier and safer than the first.

The cerebrospinal pressure was measured by a simple vertical glass tube connected with the tapping needle. The pressure varied between 180 and 223 mm. in a tube of 3 mm. diameter.

Cisternal puncture by methods (1) and (2) on five horses showed that 170-300 c.c. of fluid could be obtained at a time, the fluid being almost entirely replaced after 24 hours. This procedure, however, caused ataxia lasting 2-3 days. One 20-year-old mare gave 175 c.c. of fluid on each of six punctures over a period of 19 days.

The normal C.S.F., as seen in 27 horses, was a colourless, odourless and transparent liquid with a salty taste, consisting of 99% water, 0.44% organic substances and 0.56% ash. Its specific weight was 1.006-1.007, its surface tension 1.042-1.047, and its pH 7.4-7.6. The chemical composition of the fluid included also 0.297-0.366 mg. % of protein, 54.58 mg. % of sugar, 720-780 mg. % of sodium chloride, 4.1-5.2 mg. % of calcium and 2.3-3.1 mg. % of urea. There were 2.5 cells per c.c.

THALHIMER, W., SOLANDT, D. Y., & BEST, C. H. (1938). Experimental Exchange Transfusion Using Purified Heparin.—*Lancet.* 235. 554-557. 5 figs., 1 table. [5 refs.]

Exchange transfusions, by the use of a specially designed pump and purified heparin to prevent thrombosis, were carried out between two anaesthetized dogs. Urea accumulating in the blood of one dog subjected to bilateral nephrectomy was rapidly excreted in the donor's urine, the blood urea level falling to normal within 12-18 hours. No injurious effects were noticed in the tissues of the donor dogs following the transfusion, after they had been allowed to recover.—ALFRED EDEN.

GAUS, O. (1938). Ueber Hämosiderose der Leber und Milz beim Haushuhn. [Haemosiderosis of the Liver and Spleen in Domestic Fowls].—*Dtsch. tierärztl. Wschr.* 46. 805-806. [Numerous refs.]

Examining normal fowls, G. found that their livers contained considerable amounts of haemosiderin. He concludes that this is a natural occurrence in fowls and explains it on the grounds that the liver of these birds is the only organ

adequately adapted for the breakdown of old erythrocytes ; consequently haemosiderin is concentrated in the liver, instead of being spread throughout various parts of the body as in the case of mammals.—E. J. PULLINGER.

- I. BERLINER, V., & WARBRITTON, Virgene. (1937). **The Pituitary and Thyroid in Relation to Sperm Production in Rams.**—*Proc. Amer. Soc. Anim. Prod.* 1937. pp. 137-142. 1 table. [11 refs.]
- II. COMSTOCK, R. E., & BRADY, D. E. (1937). **A Study of Characteristics of Normal and Abnormal Semen of the Sheep.**—*Proc. Amer. Soc. Anim. Prod.* 1937. pp. 233-238. 2 tables. [5 refs.]

I. The mechanism of thyroid activity on sperm production is still not clear, but the fact of chief importance to breeders is that when high temperatures prevail before and during the onset of the breeding season, rams with a high range of thyroid activity are better able to reproduce. Thyroid specimens were obtained by biopsy and examined. Low thyroid activity can be corrected in a relatively normal animal by thyroxin therapy. The authors state that rams which do not readily respond to this treatment should not be used for breeding.

II. Data were collected on length of sperm head, co-efficient of variability of sperm head lengths, ability to live under conditions in which semen is preserved for artificial insemination, number of spermatozoa per c.c., and pH of semen. The pH of sheep semen containing normal numbers of sperm is 6.9 or less. In the semen of rams fed a short ration (insufficient calories) of high quality the number of sperm per c.c. was high, but the quantity of ejaculate was low. Motility of sperm after storage is a partial indication of quality.—J. A. GRIFFITHS.

DE NITO, G. (1936). Ueber eine neue Schnellmethode zur Frühdiagnose der Schwangerschaft. [**A New Rapid Method for Early Diagnosis of Pregnancy**].—*Münch. med. Wschr.* 83. 1272-1273. [8 refs.]

The author's method is to inject 5-10 c.c. filtered urine into the ear vein of a rabbit. A leucocyte count is made before, and 2-4 minutes after the injection, a decrease in leucocytes signifying pregnancy. This method gave 90% positive results when employed on the urine of about 100 women at various stages of pregnancy.—J. E.

STIEGLECKER, G. (1938). Ueber die Verwendbarkeit der Schnellmethode nach Nito zur Bestimmung der Gravidität beim Rind. [**de Nito's Method of Pregnancy Diagnosis Applied to Cattle**].—*Wien. tierärztl. Mschr.* 25. 483.

The urine of 20 pregnant cows was tested by this method, but as only one gave a positive reaction this method was shown to be useless as a means of diagnosing pregnancy in cattle.—A. T. PHILLIPSON.

RUNGE, S. (1937). Rozpoznanie ciąży u klaczy za pomocą badania moczu metodą E Cuboni'ego. [**Diagnosis of Pregnancy in Mares by Cuboni's Method**].—*Rozprawy biol.* 15. 62-76. 1 table. [14 refs.] [German summary].

R. considers Cuboni's method far superior in practical value to the Aschheim-Zondek method, The former is far less expensive, it can be carried out by any veterinary surgeon, does not require complicated apparatus, and takes a short time. The urine used for the method need not be fresh, it can be taken without a catheter, and a small quantity (5-15 c.c.) is sufficient. Pregnancy may be diagnosed from the 108th day.

R. examined 140 mares by the above method. The results were positive in 60 cases (42.8%), diagnosis being correct in 59 cases (98.3%), negative in 76

(54.2%), diagnosis being correct in 75 (99.2%) and doubtful in 4 (2.8%). He considers the two mistakes to have been due to urine being carelessly labelled, as this was done by various stable hands.

MORTON, R. A. (1938). **On Recent Vitamin Studies.**—*Vet. Rec.* **50**. 1169-1175. 1 table.

A general account of the properties of the different vitamins. There is no new material.—W. J. IRONSIDE.

- I. DAVIS, H. J., NORRIS, L. C., & HEUSER, G. F. (1938). **The Role of Vitamin G [B<sub>2</sub>] in Reproduction in Poultry.**—*Poult. Sci.* **17**. 81-86. 1 fig., 5 tables. [8 refs.]
- II. DAVIS, H. J., NORRIS, L. C., & HEUSER, G. F. (1938). **Further Evidence on the Amount of Vitamin G [B<sub>2</sub>] Required for Reproduction in Poultry.**—*Ibid.* 87-93. 5 tables. [9 refs.]

I. The addition of dried whey as the source of vitamin B<sub>2</sub> [vitamin G in the American nomenclature] to an otherwise adequate basal ration fed to laying pullets markedly increased the percentage hatch of the fertile eggs, but did not increase the fertility of the eggs, nor influence egg production, egg size, feed consumption, or the physical condition of the hens. The addition of a suitable amount of purified lacto-albumin to the basal diet showed that the beneficial effect of the dried whey was due to its vitamin G content rather than to its protein content. The embryos of the hens fed on the vitamin B<sub>2</sub>-deficient diet grew more slowly and showed a higher mortality than the embryos of hens receiving an adequate amount of the vitamin, as also did the chicks of the vitamin B<sub>2</sub>-deficient hens, even when fed a diet containing sufficient vitamin B<sub>2</sub>.

II. Experiments are described showing the rapid rate of depletion of the vitamin B<sub>2</sub> reserves of the hen on a vitamin B<sub>2</sub>-deficient diet which resulted in a decline of the hatchability of the eggs. Addition of riboflavin to the vitamin B<sub>2</sub>-deficient basal diet rapidly restored the hens' reserves, and the maximum hatchability of the eggs was obtained during the second week after the addition of 900 g. of riboflavin per hen per week. Approximately 245 Cornell units of vitamin B<sub>2</sub> per 100 g. of diet maintained a normal hatchability of eggs. Mortality was considerably higher in chicks hatched from the eggs of hens fed a vitamin B<sub>2</sub>-deficient diet.—R. ALLCROFT.

## TECHNIQUE AND APPARATUS

MORTON, H. E., & PULASKI, E. J. (1938). **The Preservation of Bacterial Cultures.** 1.—*J. Bact.* **35**. 168-183. 1 fig., 2 tables. [Numerous refs.]

The authors tested three methods of preserving bacterial cultures:—(a) sealing the end of the tube containing actively growing organisms in beef infusion broth, (b) the covering with sterile heavy paraffin or mineral oil of cultures on appropriate solid media, and (c) a rapid desiccation method very similar to that of SWIFT (1921). Numerous aerobic types and a few micro-aerophilic types, but no anaerobic types, were used for these three experimental studies. Optimum temperature for storage varied according to the bacteria used.

The criticism of method (a) was that several species of bacteria did not survive for more than a few months, and others underwent dissociation by changes in colony type and pigment formation. Otherwise, about 20 bacterial species showed no changes after 45 months' storage.

Failure to survive for more than a few months was also recorded for certain

species of bacteria when method (c) was used. The general criticism of the method was the complicated apparatus and technique required, and the excessive work necessary; faults in technique are a potential danger, with consequent failure to preserve a strain.

The authors stress the many points in favour of method (b). Chief of these were reduction in contamination of cultures, especially by moulds, and failure to cause dissociation colony types. The authors consider it to be the method of choice for unstable species of bacteria. Storage survival periods of 44 strains of various bacterial species are tabulated for refrigerator, room and incubator temperatures. The authors point out the necessity for using a non-rancid, atoxic oil, and detail the technique of sub-culturing which they employed.—C. V. WATKINS.

CORPOR, H. J. (1938). **A Simple Procedure for the Diagnostic Culture of Tubercle Bacilli.**—*J. Lab. clin. Med.* **23**. 1195-1202. 2 figs., 1 table. [11 refs.]

A convenient method is described for the isolation of small numbers of tubercle bacilli from sputum, urine, etc. The material is treated with an equal volume of 5% oxalic acid at room temperature for 2-5 hours. The action of the acid is then inhibited with a sterile neutral buffer solution, and the sediment is planted on to a crystal violet potato cylinder in an aqueous solution of glycerin, or on to inspissated glycerin egg-yolk medium. C. employed screw-capped glass vials (35 c.c. capacity) throughout the operation, a pad of cork being inserted in the cap to ensure the maintenance of an adequate air supply to the culture. Good results were obtained by two independent workers both employing this technique.—

—E. C. HULSE.

SALOMON, W. (1937). Zur Färbung von Bakteriengesseln. [**The Staining of Bacterial Flagella**].—*Z. InfektKr. Haustiere.* **51**. 803-812. [Num. refs.]

Methods of staining flagella are discussed. S. considers that Casare Gil's method is very satisfactory, but he also recommends the use of a simpler method which he has developed. This involves staining with a 3-5% solution of victoria blue, after mordanting with a mixture of alum, corrosive sublimate and tannin. Details are given regarding the correct way of preparing smears for flagellar staining.—E. J. PULLINGER.

SCHERP, H. W., & HUGHES, T. P. (1939). **A Simple and Inexpensive Apparatus for the Desiccation of Biological Materials from the Frozen State.**—*J. Immunol.* **36**. 29-36. 1 fig. [5 refs.] [See also *V. B.* **9**. 348].

The apparatus described can dry up to 40 c.c. serum distributed in 4-8 containers attached by means of a manifold to a tube filled with "drierite" (a specially prepared anhydrous calcium sulphate) which is connected to a Hyvac pump and to a McLeod pressure gauge. The frozen samples are attached to the manifold and kept frozen until a pressure of 0.05 mm. is reached. After 18-24 hours' drying, the containers are sealed off.—R. ALLCROFT.

KOCH, J. (1938). Ueber die Technik der Bluttransfusion beim Pferde unter Berücksichtigung der Verträglichkeit des Spenderblutes. [**Technique of Blood Transfusion in Horses with Regard to Tolerance to Transfused Blood**].—*Arch. wiss. prakt. Tierheilk.* **73**. 266-284. 2 figs., 4 tables. [Num. refs.]

A technique was worked out by which 4.2 litres of blood can be transfused from one horse to another in 15 minutes. The apparatus employed is a simple commercial one; it is described in detail.

Six blood groups have been described in horses, but the process of determining

the group of any particular horse is slow. A simple method, which takes 15 minutes to perform, has been used to see whether the blood of the donor is suitable for the recipient. Samples are taken from both, and the corpuscles of the donor are put up against the plasma or serum of the recipient. This test is essential as the transfusion of unsuitable blood leads to severe clinical symptoms, including acceleration of the pulse and respirations, a rise in blood pressure, perspiration, muscle tremors and general weakness; death may occur. With a suitable blood transfusion the blood pressure of the recipient may usually be expected to rise 3-6 hours later and the temperature to rise to normal after about six hours.—A. T. P.

McNAUGHT, K. J. (1939). **The Determination of Cobalt in Animal Tissues.**—*Analyst*. **64**. 23-27. 2 tables. [15 refs.]

The nitroso-R methods for the estimation of Co in animal tissues has been further modified, with a claimed sensitivity down to 0.05  $\gamma$ . In brief, the method consists of wet digestion of the tissue with  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$ , fuming off the  $\text{H}_2\text{SO}_4$ , and extraction with  $\text{HCl}$ . Fe is removed by extraction with ether and Cu by  $\text{H}_2\text{S}$ . The Co-nitroso-R colour is then developed at the neutral point and buffered by sodium acetate, with various improvements on previous procedures. The excess reagent is destroyed by  $\text{HNO}_3$ , and the final volume brought to 10 ml., after which the colour is matched in tubes of narrow bore against standard amounts of Co similarly prepared. Excellent recoveries of added Co were obtained and Co determination made upon 2 g. wet weight of rat livers showed on seven animals an average content of 0.2 p.p.m., expressed on a dry matter basis.—ALFRED EDEN.

ANON. (1939). **The Cyclotron. Its Application in Medicine.**—*Brit. med. J.* Jan. 14th. 81.

A brief account is given of a lecture delivered by Dr J. D. COCKCROFT on the construction and application of the cyclotron. This apparatus is extremely complicated and costly and has not yet emerged from the experimental stage, but its promise is evidenced by the fact that energies exceeding six or eight million volts have been obtained. The main applications of the cyclotron at present are three:—(1) as a powerful generator of neutrons for use in physical and biological experiment; (2) as a machine for producing in large quantity the radio-active forms of the common elements, and (3) as a means of producing extremely energetically charged particles, *viz*, protons, deuterons and alpha-particles, and permitting the study of their interaction with matter. Experiments indicated that neutrons may have a differential effect on normal and malignant tissue, and that such difference may be favourable to their use in the treatment of malignant disease.—R. ALLCROFT.

REKROTH, E. (1937). Ueber die Brauchbarkeit der Takata-Reaktion in der Hundepraxis. [**Value of the Takata Reaction in Dog Practice**].—*Inaug. Diss., Berlin*. pp. 29. 6 tables. [Numerous refs.]

The Takata reaction is a colour test which is elicited when certain pathologically altered fluids are added to a mixture of  $\text{HgCl}_2$  and  $\text{Na}_2\text{CO}_3$  in the presence of fuchsin; the development of a violet colour indicates a positive reaction. This colour change is thought to depend on the presence of excess protein, or to an abnormal proportion of proteins in the fluid (serum, cerebrospinal fluid, ascites fluid, etc.).

R. applied the test to some canine diseases (nephritis, tuberculosis, Stuttgart disease, distemper, etc.), but obtained no results of any significance. The test is therefore considered non-specific and useless for differential diagnosis.—J. F.

## MISCELLANEOUS

- I. WILSON, J. E. (1938). **Poultry Husbandry and Its Influence on the Incidence and Spread of Disease.**—*Vet. Rec.* **50**. 1493-1496. Discussion 1496-1499. [2 refs.]
- II. ANON. (1938). **The Veterinary Profession and the Poultry Industry.**—*Ibid.* 1499-1501.

I. The writer discusses the systems of management of adult fowls in Great Britain, *viz.*, (1) the extensive system, (2) the semi-intensive system, (3) the intensive system, and (4) the battery system. The advantages and disadvantages of each system are dealt with and it is stated that the chief factors in controlling and preventing disease are:—suitable diet, vigorous culling, avoidance of over-crowding, strict hygienic methods, and prophylactic measures where indicated. W. favours the intensive system from the point of view of control of disease, but considers that taking all factors into consideration the extensive system should be employed if possible, poultry being included in the rotation of farming. The latter point was amplified by DOBSON during the discussion and the importance of isolation of fresh stock was emphasized. The influence of environment on disease was mentioned by TAYLOR; this factor operates not only in the case of parasitic diseases but also in the case of those caused by bacteria and viruses.

II. An editorial article concerning the report of the Poultry Technical Committee, established by the Minister of Agriculture, England and Wales, and the Secretary of State for Scotland [*V. B.* **8**. 395].—J. C. WALLACE.

COCKAYNE, A. H. (1939). **Investigation of Animal Diseases. Formation of a New Division.**—*N.Z. J. Agric.* **58**. 193-196. 3 photographs.

In order to co-ordinate all research activities within the Department of Agriculture a new Division of Animal Research has been created. Dr J. F. FILMER has been appointed Director. The Division incorporates the Veterinary Laboratory, Wallaceville, the Ruakura Farm of Instruction, and the Chemical Section.

—L. W. N. FITCH.

POLLOCK, R. C. (1939). **How the Work of the National Live Stock and Meat Board Relates to Veterinarians.**—*J. Amer. vet. med. Ass.* **94**. 198-201.

An account is given of the activities of the National Live Stock and Meat Board, whose objects are to initiate and encourage education and research in regard to livestock and meat products, to disseminate accurate information about meat in the diet and its relation to health, and to promote the interests of the livestock and meat industry.

The Board conducts research into various aspects of meat production and consumption. An educational programme on the dissemination of information to housewives on meat cooking, and retailers on the merchandizing of meat has been carried out. Contacts are established with the medical and dental professions and with the general public by means of exhibitions and conventions.—H. V. H.

TANGANYIKA TERRITORY. (1938). **Veterinary Education [in 1937].** [LOWE, H. J.] —*Rep. Dep. vet. Sci. Tanganyika, 1937.* pp. 154-155.

Veterinary education of natives of Africa only is referred to. The curriculum included:—(a) elementary anatomy and physiology of the domesticated animals, and (b) the more important diseases of the domesticated animals in Tanganyika Territory. Ten out of 12 selected students had completed the course and satisfied the examiners, and were performing very useful work as native veterinary assistants

both in the field and the laboratory. The course would occupy an intermediate position between the higher standard of the Veterinary School in Uganda and the very elementary instructions given to native "veterinary guards".—S. A. EVANS.

DU TOIT, P. J. (1937). *Veterinäre Tropenmedizin in Südafrika. [Tropical Veterinary Medicine in South Africa].—Festschrift Bernhard Nocht, 1937.* pp. 681-685. Hamburg: Friederichsen, de Gruyter & Co. [In German].

An outline of the more important animal disease problems of South Africa and of the ways in which they were brought under control by KOCH, THEILER and others. The diseases dealt with include nagana, East Coast Fever, rinderpest, African horse-sickness, and bluetongue.—J. E.

CHEW, A. P. (1937). *The Response of Government to Agriculture. An Account of the Origin and Development of the United States Department of Agriculture, on the Occasion of Its 75th Anniversary.* pp. 107. 1 appendix. [2 refs.] Washington: United States Government Printing Office. [8vo] [15 cents].

This is a popular booklet. Veterinarians will be interested chiefly in the chapter on animal diseases (pp. 30-32), for the control of which the Bureau of Animal Industry was founded in 1884 with the immediate purpose of eradicating contagious bovine pleuro-pneumonia.—J. E.

FARINAS, E. C. (1938). *The Veterinary Services and Animal Husbandry in the Philippines.*—*J. S. Afr. vet. med. Ass.* 9. 155-165.

The Bureau of Animal Industry comprises five divisions, those of Animal Disease Control, Veterinary Research, Animal Husbandry, Animal Products, and Administration. The country is divided into 15 veterinary districts, each embracing 2-3 provinces. The field veterinarians are subject to a semi-military organization owing to the requirements of the country. The eradication of rinderpest without slaughtering-out, which required almost superhuman efforts owing to the nature of some parts of the country, is regarded as the greatest achievement of the veterinarian in the Philippines. Meat inspection and animal husbandry are both in charge of veterinarians, and artificial insemination is applied extensively.

—E. M. ROBINSON.

MOGUEL, F. (1938). *Veterinary Medicine in Mexico.*—*J. Amer. vet. med. Ass.* 93. 214-216.

An account is given of veterinary education in Mexico, beginning with the establishment of a government agricultural and veterinary school at San Jacinto in 1854. This was closed in 1914 but re-opened as the National School of Veterinary Medicine in 1916. Great progress was made and in 1929 this school became affiliated to the University of Mexico. The six year course followed by students is outlined; before graduation students are employed as assistants in laboratories, clinics, abattoirs, "packing houses" etc. Information is given concerning educational assistance in the form of grants which are made to the majority of students. The article concludes with references to the various openings available to veterinarians and a short history of the Bureau of Agriculture and Livestock up to the time of its reorganization in 1931.—J. C. WALLACE.

LINON, G. (1938). *La vente des bovidés atteints de tuberculose légalement contagieuse est-elle nulle? [Annulment of the Sale of Tuberculous Cattle in France].—Rec. Méd. vét.* 114. 722-726. [3 refs.]

This article is a discussion of the legality of any sales of cattle which are found

to be tuberculous within the meaning of the law. L. considers that such sales are null and void, because these animals cannot be the object of a free contract, according to the civil law; in his opinion, it should be possible for the buyers to get such sales annulled.

ANON. (1939). Amélioration de la recherche scientifique vétérinaire. [**Government Support for Veterinary Research in France**].—*Rev. Méd. vét., Toulouse*. 91. 100-101.

By a decree of May 24th, 1938, a veterinary research council was formed consisting of nine prominent veterinary officials and the several inspectors general of veterinary sanitary services under the presidency of the Minister of Agriculture. The council give advice on the subject of research and on funds to be allocated for it.—J. E.

I. HOFMANN, F. (1938). Der Tierärztliche Berufsstand in Oesterreich und seine dienstliche Gliederung. [**Veterinary Service in Austria**].—*Dtsch. Tierärztebl.* 5. 225-229.

II. BAUER. (1938). Das Veterinärwesen in Oesterreich. [**Veterinary Affairs in Austria**].—*Reichsgesundheitsblatt*. 13. 290-291.

I. An interesting account of veterinary affairs in Austria, published in June, 1938. After the war there was a surplus of veterinary surgeons in the country, and therefore much poverty among them. The civil veterinary service is attached to the Ministry of Agriculture and Forestry, and consists of an official veterinarian in each of 90 government districts. These persons deal with scheduled diseases, market inspection etc. All meat inspection is carried out by veterinarians.

The Animal Diseases Control Institute at Mödling was founded in 1909 and is now organized in three departments—for the preparation of biological products, for diagnosis and for research. The staff comprises eight veterinarians and 70 other workers.

Veterinarians play an important part in the organization of animal breeding and there are 20 veterinary officers in the Austrian army.

A short account is given of the Veterinary College at Vienna. In June, 1938, there were 16 professors, 42 teaching assistants, and some 300 students.

II. After mentioning the laws on which animal disease control is based in Austria, B. goes on to point out certain modifications which have been enacted in order to bring the country into line with Germany.—J. E.

## OFFICIAL AND OTHER REPORTS

TANGANYIKA TERRITORY. (1938). **Annual Report of the Department of Veterinary Science and Animal Husbandry 1937**. [HORNBY, H. E.] pp. 158. 29 figs. on 18 plates, numerous tables, 2 maps. Dar-es-Salaam: Govt. Printer [fcp] [Shs 5]. [See also *V. B.* 8. 326].

This report is of the same character as in the past, but the contents are arranged somewhat differently to conform with a uniform method of preparation suggested for Colonial Veterinary Departments. A comprehensive index assists in easy reference to sections and sub-sections.

Owing to the enormous preponderance of native-owned stock, the field operations described of necessity refer mainly to these, but the economic research being conducted should benefit the European settlers in the first place.

The research section is devoted almost entirely to nutrition and pasture experiments. Animal disease problems which are included under "Laboratory Operations" received but scant attention owing to decreased European personnel,

According to the livestock census there were 5,035,088 cattle and some 4,460,169 sheep and goats. The expenditure on the veterinary department was £40,000. [Sections of the report are abstracted separately in this *Bulletin*.]—S. A. E.

**TANGANYIKA TERRITORY. (1938). Disease Control [in 1937].—Part I. Field Operations.** [LOWE, H. J.]—*Rep. Dep. vet. Sci. Tanganyika, 1937.* pp. 9-20. 1 table, 2 maps.

#### FIELD OPERATIONS.

**TRYPANOSOMIASIS.**—With more than two-thirds of the country submerged in a sea of tsetse-infested bush, the incidence of trypanosomiasis continued in all domesticated animals inhabiting areas on the periphery of, or often surrounded by, "fly" belts. *T. congolense*, *T. vivax* and more rarely *T. brucei* are the species of trypanosomes chiefly responsible for general mortality, whilst the rapidly fatal *T. simiae* of pigs was recorded from the Northern and Tanga Provinces. Discriminative clearing of bush in the vicinity of Mpwapwa laboratories is being carried out, under the guidance of the Tsetse Research Department, in an endeavour to stop the encroachment of *Glossina pallidipes*.

**EAST COAST FEVER.**—The position in regard to this tick-borne disease remained unaltered in any material aspect. Excellent results are obtained where dipping tanks are available and regular dipping can be enforced, but such facilities are few and far between.

**RINDERPEST.**—1937 was rather disastrous owing to the spread of this disease, and practically every province in the Territory became affected. At the close of the year a continued southward spread constituted a direct menace to neighbours to the south, *viz.* Nyasaland and Northern Rhodesia.

**CONTAGIOUS BOVINE PLEURO-PNEUMONIA.**—The outstanding feature in this disease was an outbreak in the Musoma district of the Lake Province. This was the first time, in British Administration, that the disease had spread outside its close quarantine areas in the Northern and Tanga Provinces.

Other diseases such as anthrax, blackquarter, heartwater, foot and mouth disease, tuberculosis, brucella infection, anaplasmosis, piroplasmiasis, rabies, various skin diseases, plant poisoning, etc., are recognized and their significance is discussed, and there are brief notes on diseases of pigs, horses, dogs and poultry.

#### MEAT INSPECTION.

The results of the inspection of 15,048 cattle, 25,360 sheep and goats and 668 pigs are briefly reviewed. *Cysticercus bovis* in cattle and *C. cellulosae* were as usual the main cause of condemnation of whole carcasses. CASEOUS LYMPHADENITIS was frequently encountered in sheep and goats.—S. A. EVANS.

**TANGANYIKA TERRITORY. (1938). Disease Control [in 1937]. Part II. Laboratory Operations.** [EVANS, S. A.]—*Rep. Dep. vet. Sci. Tanganyika, 1937.* pp. 21-23.

Planned research on specific animal disease was practically abandoned owing to increased routine and decreased European personnel.

**ANTI-RINDERPEST SERUM AND VACCINE PRODUCTION.**—Field issues amounted to 106,660 doses of serum (unit 40 c.c.) and 7,800 doses of vaccine (unit 10 c.c.). Production was seriously handicapped by intercurrent TRYPANOSOMIASIS in the serum producers.

**MORBID SPECIMENS.**—6,068 specimens were received for examination, from field sources, an increase of 1,419 over the previous year. A high percentage of these specimens consisted of blood and organ smears which were promptly dealt with by trained native veterinary assistants.

UNION OF SOUTH AFRICA. (1937). **The South African Institute for Medical Research. Annual Report for the Year ended 31st December 1936.** [LISTER, S.] pp. 98. 8 tables, 2 photographs. [Numerous refs.] Johannesburg: The South African Institute for Medical Research. [8vo].

A commencement was made with an attempt to isolate bovine strains of *Mycobacterium tuberculosis* from human sources. Thirty-eight strains were isolated from bone, joint and other material from young subjects, but all proved to be of the human type. A number of sera, mainly from South West Africa were positive to the agglutination test for brucella infection, using smooth strains of both *Br. abortus* and *Br. melitensis*. Two cases of empyema in man were encountered where the cause was found to be a species of *Actinomyces*, corresponding to *A. asteroides* which is recorded as causing pulmonary lesions in both man and laboratory animals.—E. M. ROBINSON.

UNION OF SOUTH AFRICA. (1938). **The South African Institute for Medical Research. Annual Report for the Year ended 31st December, 1937.** [LISTER, S.] pp. 88. 2 tables, 2 photographs. [Numerous refs.] Johannesburg: The South African Institute for Medical Research. [8vo].

The search for bovine strains of *Mycobacterium tuberculosis* in cases of TUBERCULOSIS in man was continued. Ninety-eight strains were isolated from bone, joint, gland and other material, but no bovine types were encountered.

During the year, cases of *Listerella monocytogenes* infection were encountered among rodents in the Northern Transvaal which were suspected of being plague-infected.

A case of RABIES is described in which the cerebrospinal fluid was shown to be free from the virus. In another case, judging from the history obtainable, the incubation period was ten months.—E. M. ROBINSON.

PALESTINE. (1938). **Report of the Veterinary Service of the Department of Agriculture and Fisheries for the year ended 31st March, 1938.** [SMITH, J. M.] pp. 20. 6 appendixes. Jerusalem: Govt. Printer. [fcp].

ANIMAL CENSUS.—According to the fourth biennial census the following stock were in the country:—175,000 cattle, 209,000 sheep, 361,000 goats, 20,000 horses, 9,200 donkeys, 28,000 camels and 2,660,000 poultry.

ANIMAL DISEASES.—CONTAGIOUS MASTITIS due to *Streptococcus agalactiae* is reported to be spreading, but as in the case of TUBERCULOSIS, funds and personnel are not available for its control. There were 56 outbreaks of ANTHRAX, involving 15,000 animals, 221 of which died. An increase in the incidence of TUBERCULOSIS was revealed by the survey in 1937, but in view of the financial situation the Government was unable to provide funds for a plan of eradication. Ten cases of EPIZOOTIC LYMPHANGITIS were reported, and 17 of GLANDERS. There were no cases of HAEMORRHAGIC SEPTICAEMIA. Several outbreaks of SALMONELLA infection occurred in chicks 1-80 days old and in ducklings, with a high mortality. The number of herds under control for BOVINE CONTAGIOUS ABORTION was 125, an increase of 16 over the previous year. Only one outbreak of BLACKLEG was reported. Sixty-two mares and eight stallions were found to be affected with DOURINE. The country remained free from serious epizootic diseases such as RINDERPEST and BOVINE PLEURO-PNEUMONIA. FOOT AND MOUTH DISEASE was introduced by smuggled cattle, and spread fairly rapidly, but the outbreak had subsided by August. There were 182 suspected cases of RABIES, and of 819 biting animals placed under observation 14 were found to be rabid. An outbreak of FOWL PLAGUE occurred, but drastic measures were successful in localizing the disease. Tick-borne diseases continued to take a toll of the country's animals.

RESEARCH SECTION. [SIMMINS, G. B.]—A total of 40,375 specimens was examined. Of 34,289 agglutination tests on the blood of cattle, performed in connexion with the control scheme for CONTAGIOUS ABORTION, 195 gave positive results. 991 private samples and 170 samples from cattle in quarantine were also examined, and of the latter five were positive. Of 3,139 animals subjected to the complement-fixation test for DOURINE, 67 (2·1%) were found to be infected. There were six outbreaks of PULPY KIDNEY DISEASE (ENTEROTOXAEMIA). Four cases of CONTAGIOUS BOVINE PLEURO-PNEUMONIA were detected in cattle imported for slaughter. Nine cases of FOWL TYPHOID and 39 cases of FOWL CHOLERA were diagnosed. A vaccine for the former and an antiserum for the latter are maintained and issued for use in outbreaks. 68,300 doses of pigeon pox vaccine were issued.

ANIMAL QUARANTINE SERVICE.—260,800 animals were imported, as compared with 320,000 in 1937 and 520,000 in 1936.

AUSTRIA. (1938). Tätigkeitsberichte der Station für Tierseuchendiagnostik an der Staatanstalt für Tierseuchenbekämpfung in Mödling für das Jahr 1937. [**Report of Work at the Diagnostic Station of the State Institute for the Control of Animal Diseases, Modling, for the Year 1937**].—*Wien. tierärztl. Mschr.* 25. 738-741.

This report is extremely condensed and cannot conveniently be abstracted. It deals with infectious and parasitic diseases of domestic and game animals, and with bacteriological meat inspection.—J. E.

NORWAY. (1935). Det Civile Veterinaervesen 1933. [**Report of the Civil Veterinary Service for 1933**]. [THORSHAUG, N. P.] pp. 77. Numerous tables. Oslo: I Kommissjon hos H. Aschehoug & Co. [8vo] [Kr. 1.25].

GENERAL.—The report covers the year ending December 31st, 1933, and gives statistics and general reviews on the different branches of work undertaken by the veterinary department of the Ministry of Agriculture. The report is divided into two parts, *viz*, the Civil Veterinary Service, and Meat Inspection. There are also short accounts, quoted from the annual reports of veterinary practitioners, of peculiar cases of particular diseases, the course of atypical outbreaks, successful methods of treatment, etc.

In 1934 there were 336 veterinary surgeons licensed to practise in Norway, and the government expenditure on the Veterinary Service for the financial year 1933-1934 amounted to Kr. 580,015 [£32,228]. Figures are given for export and import of livestock; special licence must always be obtained for the latter.

ANIMAL DISEASES.—The state of health of livestock during the year was very satisfactory. None of the more serious contagious diseases spread to any great extent, and there were no outbreaks of foot and mouth disease, rabies, glanders and farcy, swine fever or sheep scab.

Altogether 284,605 cases of disease in animals were treated by veterinarians during 1933. Incidence and mortality figures are given in tables. Of the notifiable diseases, there were 206 cases of STRANGLES, 54 sporadic cases of ANTHRAX (47 in cattle, 3 in horses and 4 in pigs), the lowest number registered during the last 20 years except 1920, 10,663 cases of SWINE ERYSIPELAS, with 3·5% mortality, 1,169 abortions due to BRUCELLA INFECTION, 29 cases of BLACKLEG, 152 cases of BRAXY, 866 cases of PIROPLASMOSIS in cattle (not notifiable), 415 cases of BOVINE MALIGNANT CATARRH, and 9 cases of EQUINE INFECTIOUS ANAEMIA. Of 7,013 poultry blood samples, 61 gave positive reactions for FOWL TYPHOID.

Forty-three herds of cattle, 389 of swine and 22 poultry farms were declared newly-infected with TUBERCULOSIS. In 22 herds of cattle the infection was

successfully controlled, but at the end of the year there still remained 121 herds of cattle, 560 of swine and 57 flocks of poultry containing positive reactors to the tuberculin test.—GUSTAV NAERLAND (OSLO).

NORWAY. (1936). *Det Civile Veterinaervesen 1934. [Report of the Civil Veterinary Service, 1934]*. [THORSHAUG, N. P.] pp. 114. Numerous tables. Oslo: I Kommissjon hos H. Aschehoug & Co. [8vo] [Kr. 1.50].

GENERAL.—In 1935 there were 375 veterinary surgeons licensed to practise. The government expenditure on the Civil Veterinary Service for the financial year 1934-1935 was Kr. 580,392 [£32,244].

Export and import figures for livestock are given. The meat inspection report contains records of the number of carcasses inspected and their classification and marking.

ANIMAL DISEASES.—The general state of health of livestock in 1934 was satisfactory. There were no epizootics of foot and mouth disease, glanders and farcy, swine fever or rabies. 317,447 cases of disease in animals were treated by veterinarians during 1934, details being given in tabular form. There were 245 cases of STRANGLES, 47 cases of ANTHRAX, 10,969 of SWINE ERYSIPELAS, 27 BLACK-LEG, 154 of BRAXY, 3 of EQUINE INFECTIOUS ANAEMIA, 5 of CONTAGIOUS EQUINE PLEURO-PNEUMONIA, and 377 of BOVINE MALIGNANT CATARRH.

In the work on TUBERCULOSIS 17,013 head of cattle in 1,240 herds were tested during the year, the cost of 145 of the herd tests being borne by the State. Of the total number of cattle tested, 2.25% gave a positive reaction; 51 herds of cattle, 379 of swine and four poultry farms were declared newly-infected during the year. 384 cattle that had given positive reactions to the tuberculin test were slaughtered, compensation being made by the State. Fourteen herds were declared free from infection, and at the end of the year there remained 158 herds of cattle, 939 of swine, and 61 poultry farms known to be infected with TUBERCULOSIS. Of the total number of cattle carcasses submitted to meat inspection, tuberculous lesions were found in 0.18% (319), the majority of which (270) were cases previously detected by means of the tuberculin test. A new scheme for the control of BOVINE BRUCELLOSIS was brought into operation on January 1st, 1935. Of 8,391 poultry blood samples, 25 gave a positive reaction to the test for FOWL TYPHOID.

Special appendixes contain the text of the relevant acts and orders, with their corresponding amendments as on August 1st, 1936, notably the Animal Disease Act and Orders, together with those relating to meat inspection, import and export of livestock, etc.—GUSTAV NAERLAND (OSLO).

NORWAY. (1937). *Det Civile Veterinaervesen, 1935. [Report of the Civil Veterinary Service, 1935]*. [THORSHAUG, N. P.] pp. 75. Numerous tables. Oslo: I Kommissjon hos H. Aschehoug & Co. [8vo] [Kr. 1.50].

GENERAL.—In 1936 there were 377 veterinary surgeons in Norway, 157 being State district veterinarians and 205 otherwise professionally occupied or in private practice. Government expenditure on the Civil Veterinary Service amounted to Kr. 1,021,498 [£56,790] for the financial year 1935-1936. Import and export figures for livestock are given.

ANIMAL DISEASES.—The general state of health of livestock in 1935 was satisfactory; the country was free from foot and mouth disease, glanders and farcy, swine fever and rabies.

During the year, 327,957 cases of disease in animals were treated by veterinary surgeons. Incidence and mortality rates are tabulated. There were 226 cases of

STRANGLES, 43 of ANTHRAX (the lowest incidence since 1889, the year in which the first of this series of reports appeared), 22 of JOHNE'S DISEASE in cattle and 9 in goats, 8,968 of SWINE ERYSIPELAS, 50 of BLACKLEG, 97 of BRAXY, 7,356 of RINGWORM, 1,191 of PIROPLASMOSES in cattle, 420 of BOVINE MALIGNANT CATARRH, 11 of EQUINE INFECTIOUS ANAEMIA, 11 of CONTAGIOUS EQUINE PLEURO-PNEUMONIA, and 6,046 cases of MILK FEVER in cows and 354 in sheep.

In the year's work on TUBERCULOSIS, 810 herds were tuberculin tested, 170 of these at the expense of the State; of the total number (11,445) of cattle tested, 420 (3·67%) gave positive reactions. Thirty-six herds of cattle, 299 of swine, and 10 poultry farms were declared newly infected. Most cases of TUBERCULOSIS in pigs were believed to be of avian origin [from this evidence it is considered that the number of infected poultry farms reported is probably underestimated]. Meat inspection of 176,631 ox carcasses, calves excluded, revealed tuberculous lesions in 318, of which 283 had given positive reactions to the tuberculin test. BOVINE BRUCELLOSIS was controlled according to the new scheme [*V. B.* 5. 514 and 794.], and special semi-annual reports on that work are issued [abstracted separately in this *Bulletin*].—GUSTAV NAERLAND (OSLO).

NORWAY. (1938). Norge: Det Civile Veterinærvesen, 1936. [**Report of the Civil Veterinary Service, 1936**]. [THORSHAUG, N. P.] pp. 70. Numerous tables. Oslo: I Kommisjon hos H. Aschehoug & Co. [8vo] [Kr. 1.50].

GENERAL.—In 1937 there were 381 veterinary surgeons in Norway licensed to practise. The Government expenditure on the Civil Veterinary Service amounted to Kr. 1,130,461 [£62,808] for the financial year 1936-1937. The main items were:—Kr. 395,000 constituting a certain percentage of the district veterinarians' salaries and their total travelling expenses; Kr. 290,500 for salaries and maintenance of the Norwegian College of Veterinary Science, which was not then fully established; Kr. 106,935, for salaries and maintenance of the State Veterinary Institute, and Kr. 250,000, for the control of diseases in livestock which are liable to cause especially severe losses (e.g., BOVINE BRUCELLOSIS). Import and export figures for livestock are given.

ANIMAL DISEASES.—The general state of health in livestock in 1936 was very satisfactory. The scheme for the control of BOVINE BRUCELLOSIS proved successful, and there was a further decrease in the number of cases of TUBERCULOSIS in cattle. There were no cases of foot and mouth disease, glanders and farcy or rabies.

338,818 cases of animal disease were treated by veterinarians during the year; occurrence and distribution are tabulated. There were 15,855 cases of MASTITIS in cows, 51 cases of ANTHRAX, 16 cases of JOHNE'S DISEASE in cattle, 10,964 of SWINE ERYSIPELAS, 82 cases of BLACKLEG, 85 cases of BRAXY, 98 cases of TETANUS in horses, 24 in cows, and 6 in sheep, 373 cases of BOVINE MALIGNANT CATARRH, 6,255 of COW POX, 3 of EQUINE INFECTIOUS ANAEMIA, 182 cases of GOAT POX, 96 cases of MANGÉ in cattle, 34 in horses, 882 in pigs, and 278 in dogs, 1,722 cases of DOG DISTEMPER, and 21 cases of PURPURA HAEMORRHAGICA. Eighteen herds of cattle were declared newly-infected with TUBERCULOSIS during the year, 19 were regarded as clean and were released from the official regulations, imposed on them and at the end of the year 148 herds remained infected. Of 195,305 ox carcasses (excluding calves) examined at meat inspection, 171 (0·087%) had tuberculous lesions, 162 of the animals having previously given positive reactions to the tuberculin test.

By the end of 1936 the scheme for the eradication of BOVINE BRUCELLOSIS had been in force for two years. During that time 2,741 herds had been registered as infected, but at the end of the same period the eradication work had progressed

so far that 75·6% of the above number of herds were already regarded as clean and released from the official regulations previously imposed on them.

—GUSTAV NAERLAND (OSLO).

YUGOSLAVIA. (1938). Izveštaj o radu Drz. bakteriološkog i serološkog zavoda u Krizevcima od god. 1923-1938. [**Report of the State Bacteriological and Serological Institute at Krizeveci, 1923-1938**]. [HUPBAUER, A.]—*Vet. Arhiv.* **8**. 373-440. 10 figs., 18 tables, 7 charts. [German summary].

The present State Bacteriological and Serological Institute at Krizeveci was established in 1901 as a part of the State School of Agriculture (which was transferred to Zagreb in 1920 and given the rank of High School). The Institute was under the direction of Professor KERN until 1922; since then Professor HUPBAUER has been Director and has enlarged it by adding Serological, Virus, and Parasitological Departments. The staff consists of seven veterinary workers.

All veterinary vaccines and sera for use in Yugoslavia are prepared at this Institute, except those against SHEEP POX and SWINE FEVER, and this is the only Institute in Yugoslavia where mallein and tuberculin are produced. Autovaccines are prepared on request. Sobernheim's vaccine against ANTHRAX was made exclusively up to 1934, when the glucoside vaccine was introduced; Sobernheim's vaccine is still used for horses. Because the irritant property of saponin may lead to gas gangrene in cattle, another vaccine, without saponin, has been prepared recently. The Lorenz vaccine against SWINE ERYSIPELAS is also produced. At first Preisz's muscle powder against BLACKLEG was made, but it was later replaced by filtrate; anatoxin is now used.

Recently, work on ticks in Yugoslavia has been undertaken by the Institute.—B. OSWALD (KRIZEVCI).

FRENCH WEST AFRICA. (1938). Fonctionnement des laboratoires en 1937. [**Report of the Veterinary Laboratories for 1937**]. [CURASSON, G.]—*Bull. Serv. zootech. Epiz. A. O. F.* **1**. No. 3. 29-47. [1 ref.]

#### ORGANIZATION

In 1937 the laboratories of French West Africa were reorganized, so that from that year onwards there were central laboratories at Dakar and Bamako and local ones in each province except Mauritania [see *V. B.* **8**. 58]. At Dakar there are now three whole time veterinarians, and the budget amounts to 438,800 francs.

#### ROUTINE WORK

Details are given of the output in biological products of the laboratories; the provincial ones produce little else but rinderpest serum, while the central ones produce all the other veterinary biological preparations required in French West Africa.

#### RESEARCH

Numerous items are included, of which the following are noteworthy:—

**BACTERIAL DISEASES.**—From a strain of tubercle bacillus isolated at an abattoir, an exotuberculin was made for tests on zebu cattle. *Pseudomonas pyocyanea* infection was studied [*V. B.* **9**. 864]. Fowls affected with *Salmonella gallinarum* infection are stated to have recovered after treatment with intravenous injections of charcoal (prepared for this purpose) and also of soluseptazine.

**PROTOZOAN DISEASES.**—A **TRYPANOSOMIASIS** survey was begun: the following species have been identified:—*Tryp. evansi (soudanense)* in horses in the Ivory Coast and in cattle in French Sudan, where tsetse, tabanids and *Stomoxys* are all regarded as vectors; *Tryp. vivax (cazalboui)* and *Tryp. congolense (dimorphon)* in cattle. Over 6% of dogs at Dakar were found infected with **LEISHMANIASIS**, the majority

having skin lesions: the formol-gelification and lacto-gelification tests were found to be fairly reliable, but gave positive results in PIROPLASMOSIS. Intradermal inoculation and introduction *per vaginam* in a goat of bone-marrow from an infected dog failed to produce infection, and a subcutaneous inoculation of a canine strain of culture into a horse was similarly unsuccessful. Coccidiosis was diagnosed only in rabbits and dogs. AEGYPTIANELLA INFECTION was diagnosed in fowls and HAEMOPROTEUS INFECTION in pigeons. Short notes are given on spirilla in sheep and fowls.

VIRUS DISEASES.—An attempt to adapt RINDERPEST virus to the brains of mice was unsuccessful. A trial vaccine consisting of virus mixed with filtered normal ox bile gave varied results when used on cattle. A type of dried and pulverized vaccine was also made, but no test results are mentioned. Calves inoculated with saponin-virus mixed for a period up to 24 hours proved immune when infected 12 days later and again 3, 6 and 9 months after vaccination. Sudanese goats are fully susceptible to RINDERPEST, so that it is impossible to make a goat-attenuated virus as in India. Attempts to establish serial cultures of the causal agent of CONTAGIOUS BOVINE PLEURO-PNEUMONIA failed.—J. E.

### BOOK REVIEWS

BOYD, W. [M.D., LL.D., M.R.C.P. Ed., F.R.C.P. Lond., Dipl. Psych., F.R.S.C., Professor of Pathology, University of Toronto]. (1938). **Surgical Pathology.** pp. 886. 476 figs. [Numerous refs.] London & Philadelphia: W. B. Saunders Company. [4th Edit.] [8vo] [45s.]

The fourth edition of this work—the first appeared in 1925—fully maintains the high standard of those which preceded it. The subject matter has been brought fully up to date and short lists of references are supplied at the end of each chapter. The introductory chapter, which was omitted from the third edition, has been reinserted and gives an excellent account of the dependence of modern surgery on an adequate understanding of pathology. The second chapter of 20 pages deals with the relation of the surgeon to the laboratory, and the methods given for collecting and sending in material are of considerable interest alike to the medical and veterinary practitioner.

The illustrations, including several colour plates, are excellent. The magnification is not always given, however, and this is a serious omission in a work to be used by students.

The book forms an invaluable work of reference for all who are concerned with research and teaching of veterinary pathology, as well as for the practitioner desiring a better understanding of surgical pathology without which "... he will flounder along in an aimless fashion, hitting now the malady and again the patient, he himself not knowing which" (Osler).—E. G. WHITE.

HEGNER, R. [Ph.D., Professor of Protozoölogy, The Johns Hopkins University], ROOT, F. M. [Ph.D., Late Associate of Medical Entomology, The Johns Hopkins University], AUGUSTINE, D. L. [Sc.D., Assistant Professor of Helminthology, Harvard University], & HUFF, C. G. [Sc.D., Associate Professor of Parasitology, University of Chicago]. (1938). **Parasitology. With Special Reference to Man and Domesticated Animals.** pp. xxi + 812. 308 figs., 5 tables. [Numerous refs.] New York & London: D. Appleton-Century Company. [8vo] [25s.]

This book is a revised and enlarged edition of one published by HEGNER, ROOT and AUGUSTINE, some nine years previously, under the title "Animal Parasitology".

Following a brief introduction by Dr Hegner, the book deals with more important parasites of man and the domestic animals, in three sections:—“Protozoology”, by Hegner, “Helminthology”, by Augustine, and “Entomology”, by Root; the last section, owing to the death of Dr Root, has been revised by Huff. As one of the book’s aims is to be of service in the teaching of parasitology, a few of the commoner parasites of wild animals are included because of their availability, or their special value for teaching.

It is impossible to deal fully with such an enormous range of subjects as parasitology now comprises, within the compass of some 800 pages, so that much has necessarily been omitted. However, one would like to have seen some mention of TYZZER’s work on coccidiosis, and the several species now known to be involved, and of recent work on the life-histories of the lungworms of sheep, and of WELL’s work and FOURIE’s work on the blood-sucking activities of *Ancylostoma* and of *Haemonchus*. On the whole, however, it must be acknowledged that the selection of the more important points from the great mass of available information has been well and wisely carried out.

Although the index is very brief, the bibliographical list extending over 80 pages is most useful: the numerous illustrations are also well chosen, and there can be no doubt that the book will serve its purpose well as a manual for students, and for the use of practising veterinarians and physicians.—E. L. TAYLOR.

BROCQ-ROUSSEU, D. [Membre de l’Académie de Médecine], & ROUSSEL, G. [Ancien Président de l’Académie vétérinaire de France]. (1939). Le sérum normal. Propriétés physiologiques. [**The Physiological Properties of Normal Serum**]. pp. 690. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 140].

This volume deals with the physiological properties of normal serum from the point of view of the bacteriologist. The subject matter is divided into chapters dealing with the antigenic property, agglutinating property, haemolytic property, etc., of normal serum. Each chapter represents a concise review of existing knowledge, the opinions of a large number of workers being given in each case. These, however, are set out more or less as isolated statements, and the reader must draw his own conclusions as the authors make no attempt to do so. The book thus becomes a reference book, and for this purpose it will be found of greatest value to all bacteriological workers.—J. A. NICHOLSON.

SCHULZ, F. N. [em o. ö. Prof. der Universität Jena]. (1938). Grundriss der chemischen Physiologie. [**Chemical Physiology**]. pp. vii+181. 1 fig. Jena: Verlag Gustav Fischer. [8vo] [RM. 7].

The experience of lecturing to medical students for many years has prompted the author to write this book, in which his object has been to provide the student with a concise account of the chemical and physical processes of the body, without overburdening him with excess of detail.

Many biochemists are of the opinion that they are not concerned with the application of their subject to physiology, the result being that many text books entitled “Physiological Chemistry” deal in fact with pure biochemistry. The author is admirably qualified to overcome this difficulty, and his book gives a good account of the chemical side of physiology. The subjects are presented in a well-planned manner, each chapter being subdivided into sections. The chapters on digestion and metabolism are particularly good, whilst the question of cellular oxydation is considered in fair detail. Students should find this book a great help to them, but it does not contain sufficient detail to be classified as a book of reference.—A. T. PHILLIPSON.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

---

Vol. 9.]

September, 1939.

[No. 9.]

---

DISEASES CAUSED BY BACTERIA AND FUNGI

- I. UDALL, D. H., JOHNSON, S. D., & FERGUSON, Jean. (1938). **The Control of Mastitis in New York State.**—*Vet. Rec.* 50. 1417-1492. 1 text fig., 8 figs. on 1 plate, 3 tables.
- II. HORWOOD, R. E., & BRYAN, C. S. (1938). **Mastitis Control Program Proved Successful. Program Carried on in Upper Peninsula Sub-Station Dairy Herd.**—*Quart. Bull. Mich. agric. Exp. Sta.* 21. No. 1. 34-35.
- III. KLEIN, L. A., KLECKNER, A. L., & SCHEIDY, S. F. (1938). **Comparison of the Results of Certain Milk Tests with the Condition Found on Physical Examination of the Cow.**—*Vet. Ext. Quart. Univ. Pa.* 39. No. 72. pp. 20. 5 tables. [6 refs.]

I. In the authors' work udders are classified according to the existence of fibrosis and atrophy. Classes 1 and 2 are excellent or normal, class 3, fair, and class 4 consists of cases of chronic advanced mastitis. Subsequent laboratory examination is stated to have shown scarcely any infection in 1 and 2, a medium rate in 3, and a high rate in 4. Class 4 cows are the chief source of contagion, and their removal has a restraining effect on the spread of the disease.

While bacteriological identification of cows harbouring *S. agalactiae* is desirable in the control of mastitis the authors do not regard it as essential, and they state that a programme of complete eradication is impossible in most cases. Instead a thorough clinical examination is made, and the cows are separated into their classes. They are milked in the order:—classes 1 and 2, class 3, and finally class 4. If a cow in a clean group shows abnormality the milk is examined by the strip cup, and, if necessary, is subjected to the bromthymol blue test, the field test for chlorine or the milk incubation test, or to bacteriological investigation. Early cases detected by these means are treated by hourly milking, hot epsom salt packs, and reduction of the grain ration.

Detailed instruction on stable and milking hygiene are given to owners, with directions for washing the hands, udders, and teats with a chlorine preparation, disinfecting the stall, constructing satisfactory byres, and the purchase of additions to the herd. Remarks are made concerning special points relating to cows that are heavy producers, first-calf heifers, and freshly-introduced cows.

It is claimed that such a programme is effective in practice, and meets the needs of all concerned with the mastitis problem.

II. The elimination of mastitis by somewhat different methods to that given above is described. Chief stress was laid on the quality of the udder, and for this reason all cows were served by a bull the progeny of which had smaller and less pendulous udders than those previously found in the herd. Bacteriological examination was used to determine those cows which were affected and these were eliminated. Good husbandry and efficient sanitary arrangements prevented subsequent infection. Only two cows gave streptococci in the milk during five years, and in these the infection disappeared after subcutaneous injection of a "lacto-vaccine" consisting of 80 c.c. of infected milk with 1/3 c.c. of 1% brilliant green.

III. Examination of milk samples from two dairy fed herds was undertaken to test the reliability of certain values proposed for diagnosis of mastitis, *viz* :- leucocyte counts of one million per c.c. or over; pH above 6.8, or chlorine content of 0.14% or over.

The cows of the two herds were subjected to a routine physical examination every month, and at the same time separate milk samples were taken from each quarter. Blood-agar plates and incubated milk samples were examined and the pH, leucocyte count, and chlorine value were determined.

In the first herd 34 cows were examined over a period of 7 months. During this period 4 cows developed mastitis. Of the 30 cows which remained free from the disease 22 had a leucocyte count of over one million per c.c., 18 a pH above 6.8, and 29 a chlorine value of over 0.14%. Four cows were in the early and six in the late stages of lactation when the high values were obtained.

In the second herd 42 cows were examined for two years; 17 of these were affected with mastitis. Milk samples were obtained from 36 of the herd. Of these 32, 26 and 36 exceeded the stated limits for leucocytes, pH, and chlorine respectively. Positive results from the tests were obtained in some of the samples from all of the infected cows, but many were negative.

It is concluded, therefore, that leucocyte count, pH, and chlorine content cannot be used alone to detect mastitis.—D. D. OGILVIE.

KRETCHMAR, H. H. (1938). **The Detection of Bovine Mastitis. Results of an Examination Carried Out to Determine the Value of Certain Colour-Test Outfits.**—*J. Dep. Agric. W. Aust.* 15. 281-284. 1 table.

Two colour-test field outfits were submitted for an opinion regarding their value in the practical detection of streptococcal mastitis: 84 tests were made with bromocresol purple and 104 with bromthymol blue, check diagnoses being made on duplicate samples by microscopic examination. The results of these tests agree with the findings of previous workers that estimates of the pH of milk using colour indicators are of limited value in the diagnosis of streptococcal mastitis.

—H. B. CARTER.

WELD, Julia T. (1935). **Further Studies with Toxic Serum Extracts of Hemolytic Streptococci.**—*J. exp. Med.* 61. 473-477. 1 table. [1 ref.]

W. has confirmed and amplified her previous findings [*V. B.* 4. 597.] that under certain conditions serum extracts of haemolytic streptococci are haemolytic, leucocidal and toxic for mice, causing haemoglobinuria, anaemia and death. She has found that the same organisms may be extracted by this method up to six times in two days without any loss of potency of the toxin in the later extracts, providing the organisms are kept frozen solid between the extractions. The

toxins obtained in this way may be preserved without loss of toxicity for six months if they are kept frozen. Half saturation with  $(\text{NH}_4)_2\text{SO}_4$  precipitates nearly all the haemotoxin in the extract.

Attempts to correlate virulence and toxin production in haemolytic streptococci using this method of extracting toxin failed. Mice inoculated with the toxin showed a marked degeneration of the tubular epithelium of the kidney.—D. L. H.

NEISSER, H. (1939). **The Serological Typing of *Streptococcus pyogenes* and Its Application to Certain Infective Conditions.**—*J. Path. Bact.* **48**. 55-66. 5 tables, 1 chart. [Numerous refs.]

The method of GRIFFITH [*V. B.* **5**. 399.] was used in typing 1,211 strains of *Str. pyogenes* isolated from clinical infections in man. Of this number, 70 % were identified as belonging to one or other of Griffith's Types.

It was shown that Types 1, 2, 3, and 4 predominate in scarlet fever, Types 1 and 2 producing more severe infections than 3 and 4. In open wards a change of type often occurs due to cross-infection. There is much discussion concerning the types of streptococci in certain human conditions.—JOHN FRANCIS.

- I. IVÁNOVICS, G., & BRUCKNER, V. (1938). Chemische und immunologische Studien über den Mechanismus der Milzbrandinfektion und -Immunität. II. Mitteilung. Untersuchung der Spezifität der Milzbrandimmunsera mit verkuppelten Azoproteinen. [**The Mechanism of the Infection with, and Immunity to, Anthrax. II. The Specificity of Anthrax Antisera with Coupled Azoproteins**].—*Z. Immunforsch.* **93**. 119-136. 5 tables. [13 refs.]
- II. TOMCSIK, J., & IVÁNOVICS, G. (1938). Ueber die Herstellung des Antikapsel-Immunkörpers des Milzbrandbazillus. [**The Preparation of Anticapsular Immune Body of *B. anthracis***].—*Ibid.* 196-208. 4 tables. [12 refs.]
- III. TOMCSIK, J., & IVÁNOVICS, G. (1938). Die Schutzwirkung des Milzbrand-Antikapsel-Immunkörpers gegenüber der Milzbrandinfektion. [**Immunizing Action of the Anthrax Anticapsular Immune Body Against Anthrax**].—*Ibid.* **94**. 28-44. 7 tables. [10 refs.]
- IV. IVÁNOVICS, G. (1938). Ueber die Milzbrandimmunität. [**Immunity to Anthrax**].—*Ibid.* 436-458. 8 tables. [Numerous refs.]

I. As confirmatory support to their contention that the anthrax capsule haptene is a polypeptide compound of d (—)-glutamic acid [see *V. B.* **8**. 746.], the authors have shown that anthrax antiserum (containing capsule antibody) gives a specific serological reaction with synthetic glutamic acid-azoprotein antigen. Furthermore this reaction is even more specific than that occurring between the synthetic glutamic acid-azoprotein antigen and its homologous serum. On the other hand, no serological reaction was found to occur between either anthrax somatic antigen or capsular antigen and antibody prepared against the synthetic glutamic acid-azoprotein antigen.

II. Anti-anthrax immune serum was prepared by injecting rabbits intravenously with heat-killed anthrax bacilli. This method resulted in a 25 % mortality during the course of immunization. In about 60 % of the surviving rabbits antibodies were formed against both the capsular antigen (P-substance) and against the non-specific somatic polysaccharide (C-substance). The amount of antibody generally formed against capsular antigen was not high, precipitation generally only occurring with antigen dilutions of 1:500,000 to 1:1,000,000. In the course of hyperimmunization C antibody tended to disappear. P-substance was only antigenic when associated with the bacteria. This indicates that the purified P-substance is a true haptene.

III. When ascertaining the protective value of capsular antibody the authors encountered a surprising difference between the effect of such antibody upon rabbits and g. pigs on the one hand and upon mice on the other. Neither rabbits nor g. pigs could be immunized passively with reasonable doses of capsular antibody, whereas these animals, when immunized with killed capsulated anthrax vaccine, showed a strong immunity. [This indicates that in these animals capsular antigen has no essential immunizing effect and that immunization is only produced by some somatic antigen apparently unrelated to the C-substance]. In the case of mice however, it was possible to protect passively against 10-100 M.L.D. of virulent anthrax with reasonable doses of anticapsular antibody, whereas antiserum containing no capsular antibody failed to protect. [So far as can be judged, mice are unique in the nature of their susceptibility and resistance to anthrax. The larger domestic animals are similar to rabbits and g. pigs in this respect, for they can be immunized with vaccine made from avirulent, non-capsulated R-variants such as are used by STERNE [V. B. 8. 746]. An incidental but noteworthy point in connection with mice is that this work explains their unsuitability for use in the standardization of commercial anthrax antiserum, since they are sensitive only to the capsule antigen and antibody which is apparently of no consequence in other animals].

IV. BAIL showed that it is possible to immunize animals against anthrax with fluid taken from anthrax oedema fluid even after any organisms which happen to be present have been killed, and this is the only known way in which either killed anthrax bacilli or extracts thereof can be used successfully for immunization. The author has confirmed Bail's findings in all respects but he has furthermore shown that such oedema fluid is immunogenic even though it contains no capsular antigen (P-substance). This was done by using STAMATIN's [V. B. 7. 154.] and STERNE's [V. B. 8. 746.] uncapsulated R-variants for producing oedema fluid, and incidentally testing the resulting fluids by serological means for the presence of capsular antigen. These findings lend further support to his contention that, with the exception of the action on mice, the capsular antigen has no immunogenic significance.—E. J. PULLINGER.

STAMATIN, N. (1988). Immunisation des animaux de laboratoire et du mouton contre le charbon au moyen de souches non capsulogènes mais oedémato-gènes de *Bacillus anthracis*. [Immunization of Laboratory Animals and Sheep against Anthrax with Non-Capsular but Oedematogenic Strains of *B. anthracis*].—*Ann. Inst. Pasteur*. 61. 394-414. 4 figs., 3 tables. [17 refs.]

Although the present tendency is to use less virulent strains of anthrax for the production of vaccines, accidental deaths are still likely to occur, especially in sheep. In culturing virulent anthrax bacilli in horse blood, a mucoid variant appears which on sub-culture produces mucoid and rough colonies. The rough colonies are non-capsulated and some of these colonies are found to produce oedema when inoculated into mice or g. pigs. Once isolated these properties are retained through repeated sub-cultures and are also unchanged by passage in mice. This strain may kill mice in the usual doses, but not g. pigs or rabbits. Experiments were performed on mice, g. pigs, and rabbits, and showed that protection was afforded by inoculation with the oedema-producing non-capsulated strain. The oedematous fluid taken from mice and formalized and inoculated into rabbits also showed considerable powers of protection. Sheep inoculated with the variant strain in doses of 1-5 c.c. of 24-hour broth culture were protected against subsequent inoculation with broth culture of virulent anthrax and in further experiments favourable comparisons are afforded with other types of vaccine strains.—S. J. G.

MINETT, F. C. (1988). **The Royal Sanitary Institute, Health Congress at Portsmouth. Section D.—Veterinary Hygiene. Presidential Address [Control of Bovine Tuberculosis].—***J. R. sanit. Inst.* **59.** 427-435. [18 refs.]

The subject is dealt with from the point of view of the research worker under three headings:—

(1). Among the questions considered regarding tuberculin and its uses were the manufacture of tuberculin, methods of testing, standardization, specificity, and the frequency with which the tuberculin test should be applied in herds from which TB. is to be eradicated.

(2). In the review of experiments on eradication and the incidence of TB. in Great Britain, brief reference is made to the work of JORDAN and of EDWARDS at the Hannah Dairy Research Institute, and to the results of the survey tests by MONTGOMERIE and of ROWLANDS in Wales, by RABAGLIATI in Yorkshire and by WILSDON in Herefordshire. The incidence of TB. in herds and in the areas as a whole is discussed.

(3). The resistance of the tubercle bacillus in the outer world and the routes by which it may invade the body are considered. The work at the National Institute for Research in Dairying at Reading on the survival of the tubercle bacillus on pasture is referred to.—J. C. WALLACE.

CAMERON, A. E. (1988). **Bovine Tuberculosis in Canada.**—*Canad. publ. Hlth J.* **29.** 262-265.

C. points out that the work conducted by the Health of Animals Division of the Dominion Department of Agriculture benefits not only the live stock industry but also public health. Approximately one third of the cattle in Canada is under supervision for the control of TB. At present the extent of bovine TB. in Canada does not exceed 8%. C. explains the three different plans available for TB. control and the means of carrying them out. Data on the accredited herds etc. in the various provinces and counties is also given.—J. L. BYRNE.

I. RAUTMANN, H. (1937). Erfahrungen mit dem Tuberkulosestillungsverfahren unter besonderer Berücksichtigung der intrakutanen Tuberkulin-Reaktion. [**The Intradermal Tuberculin Test in TB. Eradication**].—*Dtsch. tierärztl. Wschr.* **45.** 81-86. 1 table.

II. FRITZSCHE. (1988). Rückblick und Ausblick auf die Tuberkulosebekämpfung der Rinder. [**The Control of Bovine TB.**].—*Ibid.* **46.** 90-91.

I. Opinion in Germany has in the past few years come to the view that even the somewhat elaborate methods used there to detect open cases of TB in the Ostertag scheme have done little to reduce the disease. Workers in various provinces, therefore, have recently been collecting data regarding the percentage of cattle affected with TB. as determined by the tuberculin test. R. reports observations made on 8,551 cattle belonging to 259 herds in Saxony and regarded as representative of all types of herds. A single intradermal test was used, carried out behind the shoulder, and R. describes a simple form of crush used to restrain the animals conveniently.

Positive reactions were found in 49.1% of the 8,551 animals, *viz.* 64.8% of bulls, 86.2% of oxen, 65.9% of cows, 44.5% of young stock over one year, and 19.5% of young stock under one year. Distribution according to size of herds was as follows:—1-5 animals, 29% positives; 6-20 animals, 37%, 21-50 animals, 60.5%, and 51 or more animals, 59.1%. The incidence of reactions in the various age groups was similar in herds of all sizes, except that in the larger herds the incidence of infection in young animals was lower (relative to the infection in

adult stock) than in the smaller herds, a finding ascribed to the fact that in the larger herds the young cattle are usually reared apart from the adult cattle and thus protected from the common respiratory route of infection.

Of the 259 herds, 70 (26.6%), all with less than 21 cattle, were free from reactors. A further 90 herds (35.1%) had no reactors amongst the young stock, most of these being herds with 6-50 cattle. R. notes that the total number of young stock in these 160 herds would have only been sufficient to supply about one half of the young stock required for replenishment of the total 259 herds dealt with.

The incidence of positives was similar in breeding and in dairy herds, but was lower in all age categories amongst the Harz cows, a circumstance believed to be due to the fact that they are largely kept out of doors. The effect of nutrition and general hygiene is discussed, and R. supports definitely the view that education of the farm workers is of primary importance and must be done by personal contacts. Separate houses for calves, young stock, and adult stock are regarded as essential. Practical difficulties appear to be considerable, however, because only a small percentage of farmers have so far joined the eradication scheme based on tuberculin testing.

II. F. supports strongly the view that clinical examination, even including examination of tracheal mucus, etc., does little towards the control of bovine TB., and that the rearing of a new herd from young stock which are negative to tuberculin and complement-fixation tests, is the only useful method. Such new herds should be tuberculin-tested at six-monthly intervals until no reactors appear, and then at longer intervals. Any open cases among the remaining animals should be disposed of as soon as possible.—A. W. STABLEFORTH.

ROSSI, P. (1937). Observation sur la diffusion de la tuberculose dans la commune de Castiglion d'Orcia (Sienne). [**Bovine Tuberculosis in Siena, Italy**].—*Boll. Sez. ital. Soc. int. Microbiol.* 9. 85-88. [In French].

A brief account of the results of the ophthalmic test on 28 animals.

PRICE, R. M. (1938). **Bovine Tuberculosis in Children**.—*Canad. publ. Hlth J.* 29. 251-254.

The present investigation in Toronto was begun in 1926 under the National Research Council, to determine the incidence, the role of milk in transmission, and the effect of eradication of tuberculosis in cattle and of more widespread pasteurization.

The results indicate:—(1) that 9.6% of extrapulmonary tuberculosis under 14 years is caused by the bovine type; (2) that this is an ingestion infection, raw milk being the vehicle, and (3) that this infection can be controlled by pasteurization, and its decrease is due to elimination of the disease in cattle, and more important still, to pasteurization throughout Ontario. P. believes universal pasteurization would eliminate this type of infection in Ontario in five years.—C. MACKIE.

PALLASKE, G. (1939). Untersuchungen zur Frage der Diagnostik, des Wesens und der Bedeutung der Eutertuberkulose des Rindes. [**Nature and Diagnosis of Udder Tuberculosis in Cattle**].—*Arch. wiss. prakt. Tierheilk.* 74. 99-116. 8 figs. [8 refs.]

P. describes the histological changes which he found in 109 tuberculous udders examined. Some of these were udders actually excreting tubercle bacilli in the milk, whilst others were only identified as tuberculous after P.M. examination. The pathology of open and closed udder tuberculosis is compared and a discussion of the pathogenesis is also included, the author showing a preference

for the theory which postulates a haematogenous route of infection. The hygienic aspects of udder tuberculosis are also considered.—E. J. PULLINGER.

TIMONEY, J. F. (1939). **Avian Tuberculosis in the Cow.**—*Vet. Rec.* 51. 191-198 and 239-243. [Numerous refs.]

T. describes a case of tuberculous mastitis in a cow, from which avian tubercle bacilli were isolated. The cow came from a small holding on which there was a flock of fowls. Members of the flock had occasionally died from a wasting disease, but the cause of death was not investigated. Acid-fast organisms were demonstrated in the milk, but on inoculation into a g. pig they only gave rise to localized retrogressive lesions of the local lymph nodes. These g. pig. lesions yielded a pure culture of organisms which were shown to be avian tubercle bacilli on cultural and pathogenicity tests.

At the P.M. examination of the cow, the udder was found to be extensively affected with tuberculosis; lesions were also present in the thoracic and abdominal cavities. These lesions were not examined bacteriologically.

In the second part of his article T. describes attempts to reproduce tuberculous mastitis in a lactating and a non-lactating cow with avian tubercle bacilli from the above case.

The lactating cow ceased to react to avian tuberculin 107 days after inoculation, but the non-lactating cow continued to react for 314 days after artificial infection.

The bacilli could be recovered only from the infected quarter. No macroscopic lesions of tuberculosis could be found P.M. 440 days after inoculation. The inoculated organisms remained unaltered in virulence for the fowl.—D. L. H.

HEPDING, L. (1938). "Ballenabszess des Huhnes" und Tuberkulose. [**Bumble-foot and TB. in Fowls**].—*Dtsch. tierärztl. Wschr.* 46. 596-598. 2 figs. [8 refs.]

A clinical and histological description of "bumblefoot" is given. The cause has been shown to be the avian tubercle bacillus, but the strains which produce such lesions are not entirely typical, as they have a relatively high pathogenicity for g. pigs. A condition simulating naturally acquired bumblefoot has been reproduced by the injection of such strains of tubercle bacilli.—E. J. PULLINGER.

FREUND, J., & ANGERINE, D. M. (1938). **The Spread of Tubercle Bacilli in the Bodies of Sensitized and Immunized Animals.**—*J. Immunol.* 35. 271-288. 1 fig., 3 tables. [15 refs.]

The authors have compared the spread of tubercle bacilli in normal and immunized rabbits after inoculation of the living organisms into the skin. Tubercle bacilli multiply in the skin of rabbits immunized with heat-killed tubercle bacilli in the first few days after inoculation. This multiplication is more abundant than in rabbits which are infected. There is however a difficulty in assessing the number of bacilli at the site of inoculation when the lesion is advanced enough to slough, as bacilli are discharged with the slough.

Tubercle bacilli introduced into the skin of hypersensitive rabbits with demonstrable antibodies reach the local lymph node 2-14 days later than they do in normal rabbits.

It was found that tubercle bacilli multiplied at the site of inoculation, although they did not spread to the lymphatic system; thus retardation of spread is not due to destruction of the bacilli but to some form of local fixation.—D. L. HUGHES.

VALLE, A. L. (1937). A tuberculose bovina contagia o homem? [**Bovine Type Tuberculosis in Man**].—*Bol. vet., Brasil.* 1. 68-71. 3 tables.

V. refers to a number of cases of human tuberculosis, particularly in children, caused by the bovine bacillus.

TROSSARELLI, L., & CELORIA, Maria L. (1938). Ricerche comparative sui terreni di isolamento e coltivazione del *Mycobacterium tuberculosis bovis*. [**Comparison of Culture Media for *Mycobact. tuberculosis* (Bovine Type)**].—*G. Batt. Immun.* 20. 672-680. 1 table. [9 refs.] [English, French and German summaries].

After dealing briefly with the various media claimed to be selective for the isolation and cultivation of bovine tubercle bacilli, the authors give the results of their own experiments, and conclude that the best media are Petragani's with pure beeswax, and Frimodt-Möller's, a modification of Löwenstein's medium in which the glycerin is replaced by 4% galactose and 0.15% alanin. They obtained growth in only 12.3% of cases on Petragani's medium, in 29% on Löwenstein's, in 40.9% on Frimodt-Möller's, and in 55.5% on Petragani's with pure beeswax; the most luxuriant growth was obtained on Frimodt-Möller's medium.—A. J. C.

BOQUET, A. (1939). Sur la culture de bacille de l'entérite paratuberculeuse hypertrophiante des bovidés. (Bacille de Johne). [**Culture of *Mycobacterium johni***].—*C. R. Soc. Biol. Paris.* 130. 200-202. [7 refs.]

Cultures were isolated from the intestine and lymph nodes by treating the ground-up tissue with 10% sulphuric acid or 4% NaOH for 10-15 minutes, neutralizing and sowing on to Löwenstein's medium enriched with *Mycobact. phlei* extract. Subcultures were made on to potato enriched with Sauton's fluid plus a 10% glycerin extract of *M. phlei*. After a year, numbers of cultures which had been subcultivated every month grew well on potato enriched with Sauton's fluid without the bacterial extract, and still later they grew on potato with the addition of 5% glycerin alone. The adaptation, however, was not complete as they did not grow in pure Sauton's fluid unless a 10% extract of *M. phlei* was added. The addition of aqueous extracts of potato produced a slight growth. In some cases, when *M. phlei* was inoculated on unenriched Löwenstein's medium, a few colonies developed after a considerable period.—JOHN FRANCIS.

I. PATERSON, J. S. (1939). **Flagellar Antigens of Organisms of the Genus *Listerella***.—*J. Path. Bact.* 48. 25-32. 1 fig. on 1 plate, 5 tables. [17 refs.]

II. BARBER, Mary. (1939). **A Comparative Study of *Listerella* and *Erysipelothrix***.—*J. Path. Bact.* 48. 11-28. 21 figs. on 8 plates, 5 tables. [12 refs.]

I. In this investigation 27 strains of *Listerella* isolated in various parts of the world from a variety of hosts—animal, human, and avian—were studied. Maximum motility was reached after 5-7 hours growth in dextrose broth at 25°C. The method of staining to demonstrate the peritrichous flagella is described. The organisms appeared to possess a well-defined capsule, but further work on this point is in progress.

Agglutination and agglutinin-absorption tests were performed. The method of preparing the antigens and antisera and the technique of the tests are described. The results of these tests indicated that all the strains had a common antigen, but that one or more other antigens existed which permitted their division into three main groups. A preliminary examination of a strain of *Listerella* from a case of meningitis in a child indicated that it was antigenically distinct from the other strains of *Listerella* examined.

II. Five strains of *Listerella* and six of *Erysipelothrix* from various sources were compared. Neither possessed capsules or formed spores, both showed a striking difference in morphology and colony growth between smooth and rough forms, and both rough forms produced enormous filaments when grown at room temperature. *Erysipelothrix* was a much more slender organism than *Listerella*. Smooth strains of *Listerella* were smaller in old cultures than in young, but the reverse was true of smooth strains of *Erysipelothrix*. Cultural characteristics were found to be similar, but *Listerella* grew much more profusely and showed more biochemical activity than did *Erysipelothrix*. The former was motile, the latter non-motile.

There was no antigenic relationship between the two organisms. They were both pathogenic to rabbits and mice although there were considerable differences in the diseases produced. Both produced areas of focal necrosis in the liver of mice and a circulating monocytosis in rabbits. *Listerella* was pathogenic to g. pigs, but *Erysipelothrix* was not. The pathogenicity for pigeons was not fully investigated, but the strains of *Listerella* tested were non-pathogenic.

B. concludes that until further work is done the names *Listerella* and *Erysipelothrix* should be retained.—JOHN FRANCIS.

- I. SHIRLAW, J. F. (1938). On the Existence of Haemorrhagic Septicaemia in the British Isles.—*Vet. Rec.* 50. 1005-1009. [8 refs.]
- II. TURNER, P. R., & HOLMES, C. R. (1938). Epizootic Bovine Pasteurellosis in Great Britain.—*Ibid.* 1010-1011.
- III. ANON. (1938). Does Bovine Haemorrhagic Septicaemia Occur in Great Britain?—*Ibid.* 1017-1018. [2 refs.]

I. A summary is given of the arguments for and against the existence of this disease in cattle in the British Isles. S., who has had considerable experience of the disease in India, recalls cases in cattle which he met in an outbreak in Northumberland in 1926. The symptoms were chiefly those of sudden and acute pneumonia, with temperatures of 105°-108°F., dyspnoea, and swelling of the throat. Early death was usual, although occasionally a more chronic type occurred. Autopsy revealed lesions of H.S., and in acute cases the gastro-intestinal tract was always involved. Complete bacteriological examination of a yearling destroyed in the acute phase of the disease showed typical bipolar organisms in blood films, lungs, lymph nodes, spleen, and liver. The organism was identified as a *pasteurella* of group I (Jones). The work of TWEED and EDINGTON [(1930). *J. comp. Path.* 43. 284.] has substantiated these observations, and it is concluded that the disease in question exists in both the septicaemic and the pneumonic forms in Northumberland.

II. An outbreak of H.S. in a mixed herd of 212 cattle is described. The total number of deaths was ten heifers and ten calves 12 weeks old. The symptoms included coughing, quick, short, painful respiration, dejection, and painful stiffness. Early diarrhoea was usual, followed by constipation. P.M. examination showed that significant lesions were confined to the lungs, which had a marbled appearance suggestive of contagious bovine pleuro-pneumonia. Smears from the lungs, spleen, liver, and small intestine, however, revealed large numbers of *pasteurella*. H.S. bacterin was effective in controlling the outbreak. The average course of the disease appeared to be about three weeks.

Details are given of three further outbreaks involving 57, 9, and 7 cattle respectively. Each animal received 5 c.c. of bacterin, and recovered.

III. A summary of the position in the light of these reports leads to the conclusion that in all probability H.S. does exist in Great Britain, where it tends to assume a subacute form.

The criteria necessary for accepting the more chronic forms of disease, in which pastuerella organisms are demonstrated on autopsy, as primary pasteurelloses, are as yet undefined. In this respect it is emphasized that the disease in question can be revealed by changes other than haemorrhagic septicaemia, and that its lesions frequently resemble those of contagious bovine pleuro-pneumonia. The causative organisms are known to change readily in virulence and thus further complicate diagnosis. As a group, however, their response to serum and vaccine therapy is very striking and such a response is indicative and may even be diagnostic in susceptible animals.

A number of points remain obscure not only with regard to the forms of the disease, but also with regard to the mechanism of natural transmission.—D. D. O.

LESBOUYRIES, BERTHELON, & BRAZIER. (1988). Mammite pasteurellique de la vache. [**Bovine Mastitis Caused by Pasteurella**].—*Rec. Méd. vét.* **114**. 710-718. [8 refs.]

The authors describe an outbreak of mastitis in a herd of twelve cows. Nine of the animals were affected, and the attacks varied in severity; in some cows there were constitutional symptoms, and pain and swelling of the udder, and in others a chronic swelling and induration of the udder, and alteration in the quality and quantity of the milk secreted. Treatment of the affected quarters by frequent milking and the use of a sulphonamide derivative did not reduce the induration. The disease was shown bacteriologically to be due to pastuerella organisms. These animals had all suffered from foot and mouth disease in a mild form, and without mammary lesions, and it was about a fortnight to three weeks after the outbreak of this disease that the cases of mastitis began to appear. It is suggested that owing to the continued decubitus of the animals, and because tissue resistance was reduced by F. & M. disease, the pastuerella organisms, normally saprophytic, were able to establish themselves within the mammary gland.—R. ISHERWOOD.

VITTOZ, R. (1988). Pasteurellose porcine en Cochinchine. [**Haemorrhagic Septicaemia in Swine in Cochinchina**].—*Rec. Méd. vét. exot.* **11**. 167-177. [17 refs.]

The pig population of Cochinchina is 700,000, and pasteurellosis is a serious disease. Virulent pastuerella were isolated from 65 out of 125 nasal pus specimens from pigs with pneumonia. A brief description is given of several outbreaks due to pastuerella. The association of the disease with low-lying land is discussed. Outbreaks occur in the rainy season; they are also coincident with the occurrence of pasteurellosis in buffaloes and fowls.

Of twelve outbreaks of swine disease studied by the authors since 1985, five were due to pastuerella, four to the swine fever virus associated with pastuerella, two to the swine fever virus associated with salmonella, and one to swine fever virus alone.—F. H. MANLEY.

HILBERT, K. F., & TAX, H. (1988). **The Value of Chemically-Killed Cultures for the Control of Cholera in Ducks**.—*Cornell Vet.* **28**. 275-280. 4 tables.

The authors have drawn attention to the difficulties of combating infectious diseases encountered in the duck-raising establishments of Long Island, these difficulties being chiefly due to overstocking. The losses are for the most part in ducklings, but breeding flocks are not exempt. Losses are expected by the owners of birds, and the economics of the industry have been adjusted accordingly. The most common disease is *Pasteurella aviseptica* infection. The authors used a phenol-killed bacterin of this organism, originating in the flock on which it is to be used. The ages of ducklings at inoculation varied from 29 to 65 days.

On four ranches 45,411 ducks and ducklings were vaccinated, and 5,761 birds, raised and fed with the others, were kept as controls. Mortality from duck cholera averaged 4.1 % in vaccinated birds, and 29.4 % in controls.—R. ISHERWOOD.

HUMPHREYS, F. A., & MOORE, T. (1988). **Haemorrhagic Septicaemia Bacterins and Their Relation to Serological Reactions.**—*Canad. J. comp. Med.* **2**, 282-284. [6 refs.]

Serological work on rabbits, g. pigs and cattle indicated that it is highly improbable that the injection of H.S. bacterins stimulates the formation of antibodies in the serum which combine with *Brucella abortus* antigen to bring about a positive reaction in serological tests for brucella infection. If such reactions occur the evidence would suggest that the injected bacterin also contained *Br. abortus*. The complement-fixation test has been found more reliable than the agglutination test for the detection of pasteurella antibodies.—D. G. MCKERCHER.

LAURITA, R. (1987). **Il B. bubalisepticus nel midollo osseo. Ricerche sperimentali. [Pasteurella bubaliseptica in the Bone-Marrow].**—*Profilassi.* **10**, 14-16. [16 refs.]

In view of the difficulty in diagnosing pasteurellosis unless fresh material is available, L. advocates packing bone-marrow in charcoal when it is necessary to preserve material for examination. He states that in material so treated the organisms would be demonstrable for 59 days; the organisms would lose their virulence, however, after six days.—HANS GRAF (ZÜRICH).

NELSON, J. B. (1989). **Growth of the Fowl Coryza Bodies in Tissue Culture and in Blood Agar.**—*J. exp. Med.* **69**, 199-209. 3 tables. [7 refs.]

N. describes the nature and growth requirements of small coccobacilliform bodies in nasal exudate resulting from fowl coryza, and prefers to use this descriptive term rather than to designate a new bacterial genus at present. The culture medium generally used was that previously described [*V. B.* **7**, 519.], in which a faint turbidity, unreliable as evidence of growth, was sometimes noted at 24 hours. Living tissue cells were not essential for growth, but better results were obtained with them. Experiments showed that factors of a diffusible nature, and derived from tissue cells, allowed growth, and that tissue cells gradually lost this factor after storage at 10°C. Increase of this growth factor in the supernatant of culture media was proportionate to the length of storage up to five days. The growth factor was inactivated at pH 6.0, but withstood a temperature of 100°C. for one hour.

The results of culture in post embryonic tissue (liver, spleen and blood) media are detailed. After artificial tissue culture for 80 generations the organisms survived on blood agar slopes and multiplied slightly after the 120th generation, but the virulence of one strain was lost on blood agar at the 88rd subculture. Tissue cultures survived storage at 10°C. for two weeks and, after desiccation, the period of survival appeared to be connected with the amount of sub-culture previous to desiccation.—C. V. WATKINS.

SANTAGOSTINO, C. (1988). **La mastite acuta parenchimatosa delle bovine da germi Coli-aerogenes. [Acute Bovine Parenchymatous Mastitis Caused by the coli-aerogenes Group].**—*Clin. vet., Milano.* **61**, 528-532. [Num. refs.]

S. notes that this form of the disease always commences with high fever and almost entire cessation of milk secretion; the affected udder contains a yellowish alkaline liquid, full of leucocytes, and oedema and haemorrhagic foci are present.

a review is given of previous work on mastitis, from 1876 onwards in which various bacilli have been isolated as causes of the disease. S. emphasizes that, although the disease is an infectious one often transmitted by milkers, there may be predisposing causes, e.g. digestive disturbances, frequently revealed by diarrhoea. The incubation period is very brief, a cow often lactating normally up to within 10-12 hours of developing all the symptoms of an attack.

The initial symptoms are unmistakable where organisms of the *coli-aerogenes* group are concerned; the temperature rises rapidly and rumination stops simultaneously with the cessation of milk secretion. The secretion drawn from the affected udder is a pale yellow, and sometimes contains red clumps: if churned for butter it leaves a liquid resembling blood serum, with a yellowish or reddish sediment. S. reports his own experiments and describes the action of the *coli-aerogenes* group. Death may result on the second or third day, and an account is given of P.M. appearances. He found inoculation with anti-*coli* serum effective, but only if administered promptly.—S. F. J. HODGMAN.

GWATKIN, R., LE GARD, H. M., & HADWEN, S. (1988). **Bovine Mastitis: Infection Due to Organisms of the Coll-Aerogenes Group.**—*Canad. J. comp. Med.* 2. 155-162. [9 refs.]

This paper is composed of the histories and bacteriological findings of ten cases, among 286 cases of mastitis examined, in which organisms of the *coli-aerogenes* group were apparently incriminated. Six of the ten cases died, and four of them recovered. The suggestion that the organisms in question were not casual contaminations is supported by the fact that cultural tests indicate the presence of members of the group to be comparatively rare in either milk or colostrum from animals without mastitis. It is suggested that symptoms produced by this type of infection in recently freshened cows may be mistaken for milk fever.—L. M. HEATH.

OGUNI, H., & KAIHOTSU, M. (1988). **Suppurative Periostitis of Horses Caused by *Salmonella abortus-equi*.**—*J. Jap. Soc. vet. Sci.* 17. 228-240 of pt. 1. 2 figs. on 2 plates. [In Japanese: abst. from English summary pp. 110-111 of pt. 2].

The authors describe suppurative lesions in horses caused by *S. abortus-equi*. Abscesses occur in the limb joints, lymph nodes, thoracic walls, withers, and scrotum.

The lesions tend to indurate and they may discharge a foul smelling creamy pus; the suppurative process in the limb lesions may extend into the deeper muscular tissue and reach the bone. The bone at first is covered by thick fibrous connective tissue, which is later changed as an ossifying periostitis develops.

—D. L. HUGHES.

- I. DEDIÉ, K. (1987). Gibt es Enteritis (Gärtner) -Dauerausscheider unter Füchsen? [**Foxes as Continuous Excretors of *Salmonella enteritidis***].—*Dtsch. tierärztl. Wschr.* 45. 458-454. [6 refs.]
  - II. WRAMBY, G. (1988). Paratyphus beim Fucha. [**Fox Paratyphoid**].—*Dtsch. Pelztierz.* 18. 856-859. 2 figs., 1 table.
  - III. POTEI, K. (1988). Enzootische Encephalitis bei jungen Silberfüchsen als Folge einer Paratyphusinfektion. [**Encephalitis in Young Foxes Following Paratyphoid Infection**].—*Z. InfektKr. Haustiere.* 53. 88-105. 4 figs. [14 refs.]
- I. An extract from an inaugural dissertation [V. B. 8. 271].

II. This is a translation into German of a Swedish article [V. B. 7. 576]. In an appendix, Dr SCHOOP gives a brief report of similar cases in Germany, and recommends vaccination combined with hygienic control.

III. In an epizootic of salmonella infection among young silver foxes, brain symptoms were observed such as "circling", holding the head to one side or tilted backwards, etc. An increased vitamin content in the food caused no improvement. The Kiel type of *S.e.* Gärtner were isolated from the central nervous system in every case.

The histopathological picture practically corresponded with that of epizootic encephalitis in foxes. A marked infiltration of the connective tissue spaces by lymphocytes and plasma cells was observed in both the grey and white matter. Progressive changes took place in the neuroglial cells, which became clumped and massed. In nearly all cases this was accompanied by an inflammatory perivascular and tissue infiltration. The ganglion cells were not damaged; only rarely was there brain haemorrhage, but the meninges were frequently affected.

—SASSENHOFF (MUNICH).

STOILOWA, E. R. (1988). Die Dotteragglutination bei der Kükenruhr. [Yolk Agglutination in Bacillary White Diarrhoea].—*Z. InfektKr. Haustiere.* 53. 236-242. 1 table. [8 refs.]

Rapid aggl. tests were carried out on yolk from the ovaries of adult hens, on the yolk residue of hatched chicks, and on yolk from eggs incubated, 6, 18 and 21 days, in order to determine the presence of *Salmonella pullorum* infection. One drop of yolk in as fluid a state as possible, and free from clots, was emulsified and thoroughly mixed with 2 drops of test fluid; best results were obtained at a temperature of 15-20°C.; the suspension was made from 48-hour culture and was phenolized; it was filtered through cotton wool and heated in a water-bath at 60°C. for 8 minutes, and finally 0.8 c.c. of 1% crystal violet solution was added for every 10 c.c.

The results were checked by enrichment culture in tetrathionate broth. The rapid aggl. test and the culture test corresponded exactly in the case of hens and hatched chicks, but not so closely with hatching eggs.

POMEROY, B. S., & FENSTERMACHER, R. (1989). Paratyphoid Infection of Turkeys. —*J. Amer. vet. med. Ass.* 94. 90-97. 3 tables. [10 refs.]

The authors describe the bacteriology of a considerable number of outbreaks of paratyphoid in turkeys. The investigations consisted of the bacteriological examination of turkey poults and of incubated eggs and the testing of blood sera for salmonella agglutinins. In the latter case the sera were first tested with whole blood *Salmonella pullorum* and *S. typhi-murium* plate antigens. Reactions to this test were then checked by the tube method with the following organisms:—*S. typhi-murium*, *S. pullorum*, *S. gallinarum*, *S. cholerae-suis*, *S. abortus-equi*, *S. enteritidis*, *S. paratyphi A* and *S. paratyphi B*.

The authors found from their investigations that *S. typhi-murium* may cause disease in turkey poults up to five weeks of age. They were able to isolate the same organism from infertile eggs and dead-in-shell embryos up to the 4th week of incubation. *S. typhi-murium* was also recovered from the ovary and oviduct of three out of ten naturally infected birds. The following organisms may also cause losses in turkey poults:—*S. anatum*, *S. newington*, *S. montevideo*, *S. derby*, *S. senftenberg*, *S. bareilly* and *S. bredeney*.—D. L. HUGHES.

STANDFUSS, R. (1988). Was leisten die gemischt-spezifisch-unspezifischen Sera für die Artbestimmung der Paratyphus-Enteritis-Bakterien? [**Differentiation of Salmonella with Mixed Specific and Non-Specific Sera**].—*Berl. Münch. tierärztl. Wschr.* November 4th. 678-679. [Also appeared in *Dtsch. tierärztl. Wschr.* **46**. 716-717].

In food inspection and meat inspection the rapid and accurate typing of salmonella is becoming increasingly important, but those engaged in such work have neither the facilities nor the time to prepare and use an endless number of pure type-specific and phase-specific sera. The author describes a method suitable for typing most of the common salmonella contaminants of food in which only six samples of antisera are required. These are mixed type and group sera of *S. brandenburg*, *S. paratyphi A*, *S. typhi-murium*, *S. cholerae-suis*, *S. enteritidis* and *S. newport*.—E. J. PULLINGER.

MEYER, K. (1988). Relations réciproques des facteurs antigéniques des *Salmonella*. [**Interrelations of the Antigenic Factors of Salmonella**].—*C. R. Soc. Biol. Paris.* **128**. 959-963. [1 ref.]

Having carried out experiments with the precipitation test, M. formed the opinion that the two somatic antigens IV and V of *Salmonella paratyphi B* appear to be components of a single molecule which maintain the same quantitative relations throughout. They are precipitated together by either a serum prepared against the somatic antigen IV or a serum prepared against V.—A. A. B. ELLIS.

ARCHER, G. T. L. (1988). **Some Observations on Salmonella Flagellar Antigens.**—*J. R. Army med. Cps.* **71**. 235-243. 5 tables. [4 refs.]

A. maintains that a number of organisms in the salmonella group have no true claim to be considered as separate species on the basis of their H antigens. Using *Salmonella typhi-murium*. var. *binns* and *S. suispestifer* (European), both of which are considered as monophasic in the group phase, A. claims that they contain dominant and recessive antigens, these terms not being used in the Mendelian sense. The dominant antigens in the above organisms are the group antigens, but they mask small amounts of specific antigens or recessive antigens. It is thus erroneous to consider them as monophasic. A. also considers that certain cultures may lack one or more of the normal antigenic components of the group phase, which are considered to be characteristic of the particular organism. [The original article should be consulted for details of technique].—D. L. HUGHES.

HERRMANN, W. (1989). Die Trennung von Mischkulturen und Phasen der Erreger der Typhus-Paratyphus-Enteritis-Gruppe mit der Schwärmpatte nach Sven Gard. [**The Separation of Mixed Culture of Salmonella by Sven Gard's Swarm Plate**].—*Zbl. Bakt. I. (Orig.)*. **143**. 207-215. [6 refs.]

The description of a method by which the swarm colony technique can be adapted for the separation of two very similar motile organisms. If a mixture of two salmonella organisms is inoculated on to the middle of the surface of a plate of semi-solid agar containing H antibody specific for the one, then after incubation the other organism will be found in pure culture in the peripheral zone where swarming is taking place. The same technique can be applied for obtaining an organism in the type or group phase by incorporating phase specific serum in the medium.

—E. J. PULLINGER.

DELPY, L., & RASTEGAR, R. (1938). Étude de souches américaines, asiatiques, et européennes de microbes du groupe *pullorum-gallinarum*. [**Study of American, Asiatic, and European Strains of Salmonella pullorum and S. gallinarum**].—*Ann. Inst. Pasteur*. 61. 536-564. 4 figs., 6 tables. [Numerous refs.]

The authors studied strains responsible for fowl typhoid and bacillary white diarrhoea in Iran and other countries. They found only slight variation in their cultural and biochemical activities. On a cultural basis they recognize five types :—*S. gallinarum*, *S. pullorum* A, *S. pullorum* B, *S. intermedius* A, and *S. intermedius* B. Those strains isolated from chickens in Iran had all the characteristics of *S. pullorum* A. The authors found the use of brilliant-green agar, xylose, dulcitol, maltose, and starch of primary importance in determining the five types.—A. A. B. ELLIS.

MARRIOTT, W. H. (1938). **Infectious Abortion of Cattle in Canada**.—*Canad. publ. Hlth J.* 29. 266-269.

Marriott claims that brucella infection is of considerable importance from the economic standpoint and deals with this phase of the problem. Vaccines have not as yet been successful in controlling the disease. The method adopted by the Dominion Department of Agriculture to accomplish this task is the identification of infected animals by serological tests and the subsequent removal of reactors from the herd. The regulations set forth by the authorities for the application of this eradication plan are described in detail. The serological tests are conducted by the laboratories of the Health of Animals Division and certain other laboratories, and consist of a routine slow agglutination test, confirmed by rapid (plate) agglutination and complement fixation tests, a standard technique being used for all. The incidence of the disease in Canada varies; in the herds under the supervision in the Dominion it averages about 2%.—J. L. BYRNE.

GRYCZ, E., & TEKLIŃSKI, A. (1938). Nasilenie brucelozy bydła na podstawie dotychczasowych wyników masowego badania serologicznego. [**Distribution of Bovine Brucellosis as Shown by Large Scale Serological Tests**].—*Pam. pańs. Inst. nauk. Gosp. wiej. Pulawy*. No. 2. pp. 56-57. 1 table. [Suppl. to *Wiad. weteryn.* 18. No. 223].

A serological test for brucellosis was carried out in Poland, with the following results :—out of 185 herds comprising 10,108 cattle, the percentage of positive reactions was under 10% in 42 herds, between 10% and 25% in 30 herds, from 25-50% in 40 herds, and over 50% in 7 herds. In 66 herds the results were negative.

EHRLICH. (1938). Die bisherigen Erfahrungen mit der Durchführung des freiwilligen Abortus-Bekämpfungsverfahrens in der Provinz Hannover. [**The Voluntary Control of Abortion in the Province of Hanover**].—*Dtsch. tierärztl. Wschr.* 46. 664-668. 2 tables.

A report of experiences gained during the course of the contagious abortion elimination campaign. In the initial herd tests it was found that a greater percentage of large herds were infected than small ones, whilst among the infected herds the percentage of infected animals was higher in the large herds. Comparing the relative values of the blood and milk agglutination tests over a series of 3,000 animals the following results were obtained :—in 89.6% of cases both blood and milk tests were negative, in 4.1% both these tests were positive, in 5.9% the blood test was positive and the milk test negative, and in 0.3% the blood test was

negative, and the milk test positive. [These results suggest that the milk agglutination test is almost valueless. When done as a supplement to the blood test it reveals an insignificant number of extra infected animals, whilst if used instead of the blood test about half the infected animals are missed].—E. J. PULLINGER.

KARSTEN. (1939). Die Brucellose die Haustiere in Südwest-Afrika. [*Brucellosis in Domestic Animals in South West Africa*].—*Dtsch. tierärztl. Wschr.* 47. 43-44.

K. claims that *Brucella melitensis* infection commonly occurs in cattle, goats and sheep in South West Africa and that man frequently contracts the infection from these animals. In order that farmers may safeguard themselves he makes the following recommendations :—(1) Those who have to handle animals which have aborted should afterwards wash in 2% lysol; (2) byres and kraals contaminated with afterbirth and excretions should be limed; (3) newborn animals should never be skinned, and no one with cut hands should act as butcher, and (4) cow's and goat's milk should not be used raw, and butter should not be made from unheated cream. [The occurrence of *Br. melitensis* in S.W.A. is of considerable interest as this infection is rarely if ever encountered in other parts of Southern Africa, though *Br. abortus* is a wide-spread infection and undulant fever in man caused by *Br.a.* is occasionally diagnosed].—E. J. PULLINGER.

SEELIG, Hildegard. (1938). Ueber die Peroxydasereaktion der Brucellen. [On the Peroxydase Reaction of *Brucella*].—*Inaug. Diss., Zürich.* pp. 55. 24 tables. [Numerous refs.]

The benzidin reaction was used in conjunction with acetate buffer at pH 4.0 to 5.0 to determine the production of catalase by 84 different strains of brucella of all three types (*melitensis*, *abortus* and *suis*). The reaction was inhibited by KCN or CO, but only when relatively large amounts were employed. The effect of heat on the reaction was found to vary greatly. It was not possible to differentiate between the three types by this reaction, but on the whole *Br.m.* was the strongest catalase producer.—P. S. WATTS.

- I. YAMAMOTO, S. (1938). Ueber die durch Nekrosebazillen verursachten multiplen Leberabszesse der Rinder. [*Multiple Liver abscesses in Cattle Caused by the Necrosis Bacillus*].—*J. Jap. Soc. vet. Sci.* 17. 40-49 of pt. 2. 6 figs. on 8 plates, 1 table. [18 refs.] [In German: Japanese summary pp. 212-218 of pt. 1].
- II. YAMAMOTO, S. (1938). Ueber die Nekrobazillose des Hirsches. [*Necrobacillosis of Deer*].—*J. Jap. Soc. vet. Sci.* 17. 36-39 of pt. 2. 6 figs. on 8 plates. [8 refs.] [In German: Japanese summary pp. 210-211 of pt. 1].
  - I. The author discusses 17 cases of multiple liver abscess in cattle. The abscesses generally varied in size from that of a hazelnut to that of a walnut and could be divided into two classes :—(1) those containing a firm central mass of necrotic tissue and (b) those without a firm central mass. From all cases *Fusiformis necrophorus* was isolated. A detailed description of this organism and of the histology of the lesions is given. There is progressive softening of the coagulated necrotic tissue from the periphery, inflammatory changes progress in surrounding tissues, and a fibrous capsule forms. In some cases reabsorption and organization progress and scar-tissue results. Necrotic nodules thus give rise first to form (a) and then to form (b) of the abscesses described.
  - II. A deer which died in a Japanese zoo had become weak and emaciated following an injury caused by the antlers of another animal about a year previously.

Autopsy revealed a diaphragmatic hernia, the major portion of the small intestine having passed into the thorax. The liver was enlarged, and many irregularly round or oval greyish-yellow necrotic foci were scattered through it, the lesions varying in size from that of a pea to that of a hazelnut. *Fusiformis necrophorus*, was isolated from these lesions. Detailed accounts are given of the histology of the lesions, and of the morphological, cultural, and other characteristics of the organism concerned.—H. E. HARBOUR.

KOBUSIEWICZ, T. (1938). Zakończenie masowego uodpornienia koni w wojsku przeciw tężcowi anatoksyną tężcową. [**Mass-Immunization of Horses with Tetanus Antoxin in the Polish Army**].—*Wojsk. Przegl. weteryn.* 9. 233-248. [8 refs.] [English and German summaries].

In the course of a general immunization against tetanus, 22,124 horses were inoculated once, 22,108 twice and 15,858 three times. Resting of horses on the day of inoculation is recommended, but this is not necessary provided there are no clinical symptoms. There were a certain number of local reactions, and in odd cases there was suppuration. Only three vaccinated horses developed tetanus.

The economical effect of the general immunization is not given. In some countries with a low incidence and mortality of horses from tetanus the expense of a general immunization is out of proportion to the actual economic losses from tetanus.—V. CHLÁDEK (PRAGUE).

TUNNICLIFF, E. A., & MARSH, H. (1939). **An Alum-Precipitated Toxoid as an Immunizing Agent against Infectious Necrotic Hepatitis (Black Disease) in Sheep**.—*J. Amer. vet. med. Ass.* 94. 98-110. 10 tables. [12 refs.]

Infectious necrotic hepatitis has been recognized in western Montana. The disease appears to be identical with that which occurs in Australia, and the antigenic relationship between strains of *Clostridium oedematiens* from Australia and Montana has been established. The use of an alum-precipitated toxoid, prepared from a highly toxic strain of *Cl. oedematiens*, prevents loss from this disease in infected areas. In controlled experiments with g. pigs bacterin lacked immunizing value and immunity conferred by anaculture was considered to be derived from the toxoid rather than the anaculture.—A. A. B. ELLIS.

KALMBACH, E. R. (1939). **American Vultures and the Toxin of Clostridium Botulinum**.—*J. Amer. vet. med. Ass.* 94. 187-191. 2 tables. [6 refs.]

American vultures (*Cathartes aura septentrionalis* and *Coragyps atratus*) were found to resist several hundred thousand pigeon or mouse lethal doses of *Cl. botulinus* types A, B and C toxins when injected intraperitoneally or given *per os*. The serum of untreated vultures protected g. pigs and pigeons against approximately  $2\frac{1}{2}$  lethal doses of toxin, both when mixed with the toxin before injection and when injected separately but simultaneously. [Unfortunately very few animals were used in the experiments and the sera were not controlled by the use of sera from other species].—P. S. WATTS.

PATOCKA, F., & ILAVSKY, J. (1939). L'acide l-ascorbique et les anaerobies. [**Effect of L-Ascorbic Acid on the Cultivation of Anaerobes**].—*Ann. Inst. Pasteur.* 62. 296-316. [Numerous refs.]

The effect of adding ascorbic acid to media was studied, cysteine media being used as controls. The following clostridia were tested: *Clostridium welchii*, *Cl. septicum*, *Cl. oedematiens*, *Cl. gigas*, *Cl. haemolyticum*, *Cl. histolyticum*, *Cl. sporogenes*, *Cl. aerofetidus*, *Cl. tetani*, *Cl. botulinum*, *Cl. putrificum*, *Cl. bifermentans*, and

*Cl. tetanomorphum*. In all, 35 strains were used. In liquid or solid media the growth of nearly all strains was improved by the ascorbic acid and in most cases made possible in aerobic conditions. It did not seem to favour toxin production unless glucose was also added, when a considerable increase in toxin was noted. The acid was found to lower the oxidation-reduction potential to an extent similar to that caused by cysteine, but the maintenance of the potential at the low level was longer.—P. S. WATTS.

SCHOFIELD, F. W. (1937). **A Case of Actinomycosis in the Horse.**—*Rep. Ont. vet. Coll. 1937*. pp. 12-13. 3 figs.

The infection originated apparently from the place of incision made for drainage of an abscess formed in the submaxillary lymph nodes of a young Clyde mare. Shortly after the wound closed a gradually increasing swelling filled the intermaxillary space. The actinomycotic character of the lesion was revealed by microscopical and histopathological examination.—H. KONST.

SCHOFIELD, F. W. (1937). **Suppurative Dermatitis due to Botryomycosis.**—*Rep. Ont. vet. Coll. 1937*. pp. 14-15. 1 fig.

Botryomycotic lesions involving the skin in the region of the shoulder and neck of an eight year old Clyde mare, were almost entirely lacking in the usual hyperplastic fibrous, fistulous character of this infection. In the slightly swollen skin there were scattered foci of granulation tissue, containing suppurating centres about the size of a hazel nut. Numerous dense granular bodies consisting of clusters of cocci were found in the pus.

Prompt recovery within three weeks followed the use of an autogenous bacterin.—H. KONST.

## DISEASES CAUSED BY PROTOZOAN PARASITES

- I. CHRISTOPHERS, S. R., & FULTON, J. D. (1938). **Observations on the Respiratory Metabolism of Malaria Parasites and Trypanosomes.**—*Ann. trop. Med. Parasit.* 32. 43-75. 14 tables. [18 refs.]
- II. FULTON, J. D., & CHRISTOPHERS, S. R. (1938). **The Inhibitive Effect of Drugs upon Oxygen Uptake by Trypanosomes (*Trypanosoma rhodesiense*) and Malaria Parasites (*Plasmodium knowlesi*).**—*Ibid.* 77-93. 9 tables. [18 refs.]

I. Oxygen uptake by trypanosomes ceases with deprivation of glucose, which results in loss of motility. Acid products are formed as the result of the metabolism of trypanosomes and the reduction in pH appears to be the cause of a gradual reduction in oxygen uptake. The ratio of glucose used and acid produced to oxygen uptake was about 1:1 and 2:1 respectively. No enzyme bringing about oxygen uptake could be detected, and it was confirmed that prussic acid has no inhibitory action on trypanosome respiration. Parasitic substance for malarial work was obtained by bleeding monkeys, defibrinating the blood and centrifuging it for 45 minutes at 2,000 r.p.m.; the large forms separated as a brown layer above the red cell column. The oxygen consumption of this substance was peculiar in that the falling off with time was very small. There appeared to be no dependence on glucose consumption, though there was a rapid disappearance of sugar from the suspending fluid. The sugar content of a parasite mixture falls within an hour or two to the same value whether glucose is added or not. Prussic acid rapidly inhibits the oxygen uptake. It is thought that the parasites obtain oxygen from the oxyhaemoglobin of the red corpuscles.

II. A large variety of drugs were tested as to their power of inhibiting oxygen uptake, and drugs effective for the treatment of malaria or trypanosome infections were found to be more active than those having no therapeutic action. The greatest activity was found amongst the trivalent arsenical compounds acting on trypanosomes. The uptake of oxygen continued as long as the parasites were alive, and except that inhibiting drugs killed the parasites no detailed mechanism of their action could be detected. It is suggested that an estimation of the power of inhibiting oxygen uptake may prove to be a delicate method of testing drugs *in vitro* for their lethal activity.—U. F. RICHARDSON.

FRENCH, M. H. (1938). **Studies in Animal Trypanosomiasis. V. Some Disturbances of the Host's Carbohydrate Metabolism Induced by *Trypanosoma congolense* and *Trypanosoma brucei*.**—*J. comp. Path.* 51. 269-281. 9 tables. [Numerous refs.] [See also *V. B.* 9. 11 and 154].

A study was made of the variation in the blood during trypanosome infection in cattle, sheep and donkeys, in respect of the sugar content, carbon dioxide capacity and lactic acid content. The severity of the infection was judged by the degree of anaemia, the time of crisis being considered as the time when the red cell content of the blood was at its lowest.

In mild infections in which the host recovered spontaneously little abnormality could be detected except for some increase of the lactic acid content at the time of crisis. In fatal infections, or those in which the animals underwent a severe crisis but were saved by treatment, there was some fall in the CO<sub>2</sub> capacity when the parasites were circulating in the blood, an increase in the lactic acid content in the later stages, and a terminal hypoglycaemia. After crisis, or on treatment, there was a return to normal.

The various theories which have been put forward to explain the pathogenic action of trypanosomes are reviewed, and it is suggested that possibly a toxin is produced by trypanosomes or by their reaction with host tissue, and that the action may be similar to diphtheria toxin in interfering with the power of the liver to form glycogen from lactate. This would leave the blood lactic acid free to deplete the host's alkali reserve, and would explain the early development of acidosis, and the increase of lactic acid in the later stages. The blood sugar would remain normal as the glycogenolytic function of the liver would be normal. At the last stage, the lowered oxygen carrying capacity caused by the anaemia added to the exhaustion of the alkali reserve would break down the defence mechanism of the host, and the glycogenolytic function of the liver would be impaired through overwork so that a terminal hypoglycaemia resulted.—U. F. RICHARDSON.

HOARE, C. A., & BROOM, J. C. (1939). **Morphological and Taxonomic Studies on Mammalian Trypanosomes. VII. Differentiation of *Trypanosoma uniforme* and *Tryp. vivax* in Mixed Infections.**—*Trans. R. Soc. trop. Med. Hyg.* 32. 629-632. 1 fig., 2 tables. [4 refs.]

Smears from a *situtunga* received for examination showed a trypanosome of the *vivax* group, but while the majority of the trypanosomes were small and conformed with the appearance of *Tryp. uniforme*, some of the forms seemed to be longer. The measurement of 100 individuals showed that the organisms fell into two groups; the distribution was bimodal (17 $\mu$  and 24 $\mu$ ), there being a gap between the length measurements of the two groups. It is pointed out that had the measurement of individuals been confined to ten random measurements, as previously recommended [*V. B.* 9. 12.], in six cases out of ten the decision would have been in favour of *Tryp. uniforme*, in one in favour of *Tryp. vivax* and in three

doubtful. Before coming to a definite decision as the result of the measurement of ten random individuals, it is necessary to ascertain that the infection is a pure one.—U. F. RICHARDSON.

IRIARTE, D. R. (1937). Contribución al estudio de la enfermedad de Chagas en Venezuela. [**Chagas' Disease in Venezuela**].—*Trabajos Científicos*. pp. 135-213. 4 figs., 1 table. [Numerous refs.] [English summary]. Caracas: Editorial "Elite". [8vo].

The reduvidid bug *Rhodius prolixus* is the vector of 60% of cases of Chagas' disease in man (*Trypanosoma cruzi* infection). Domestic animals as reservoirs of the virus are an important factor in the spread of the disease, particularly in areas where they live in close contact with man. I. gives details of histological studies of experimentally-infected rabbits and dogs, as well as details of electrocardiographic experiments upon infected g. pigs. A series of experimental inoculations of animals is described in detail. Dogs were found to be most susceptible; rats and g. pigs appeared to be less susceptible. A monkey and a squirrel showed no signs of infection 31 and 20 days respectively after inoculation, while a white rabbit and an armadillo died a few weeks after injection, no trypanosomes being present in the blood before death. Protective inoculation of human beings with Bayer 205 was ineffective. For diagnosis a complement-fixation test is used; an extract of spleen from puppies previously inoculated with heavy doses of *Tryp. cruzi* serves as the antigen.—J. PASFIELD.

POP, A., & OGNERU, D. (1937). Recherches sur la trichomonose bovine chez les vaches sacrifiées à l'abattoir municipal de Bucarest. [**Trichomonas Infection in Cattle Slaughtered at Bucharest Abattoir**].—*Arhiva vet.* 29. No. 5. 12-25. 1 fig. [Numerous refs.] [In French: German summary].

Material from 278 cows was examined microscopically and culturally, and *Trichomonas genitalis* was isolated from the uterus in nine cases. In four of these cases the organism was isolated in pure culture; in five it was associated with coliform bacilli, staphylococci and streptococci.

- I. BOULAY, P. (1937). Contribution à l'étude de la babésiellose bovine en France. [**Bovine Babesiosis in France**].—*Thesis, Alfort*. pp. 90. 3 figs., 1 graph. [Numerous refs.]
- II. CERNAIANU, C. (1937). Piroplasmes et piroplasmoses des animaux domestiques en Roumanie. [**Animal Piroplasmosis in Rumania**].—*Arch. roum. Path. exp. Microbiol.* 10. 281-293. 1 text fig., 3 figs. on 3 plates. [Numerous refs.] [In French].
- III. PIGOURY, L. (1938). Nouvelles identifications de piroplasmes du boeuf au Levant français. [**New Identifications of Bovine Piroplasms in the French Levant**].—*Bull. Soc. Path. exot.* 31. 294-296. [3 refs.]
- IV. DONATIEN, A. (1938). Les vaccinations contre les piroplasmoses bovines. [**Vaccination against Bovine Piroplasmoses**].—*Arch. Inst. Pasteur Algér.* 16. 87-58.

I. The common cause of babesiasis in France is *Babesia bovis*, though another type, "*Babesiella*" *major*, has been described. The former occurs in all parts of France and is transmitted by *Ixodes ricinus*. Symptoms and P.M. appearances are described. Trypanblue is without effect in treatment, but gonacrine, trypanflavine, urotropine, ichthargan, and acaprin have each been successfully used. Two inoculation experiments are described, both of a benign character, and also a number of clinical cases. Mortality is said to occur in 5-6% of cases in France.

II. *B. bigemina* and *B. bovis* both occur in Rumania, the former being transmitted by *Boophilus calcaratus* and the latter by *I.r.* *B. bovis* is not found north of latitude 45° N., and the mortality in infected areas varies with the breed, and is more severe in dry summers. Both types of piroplasm may cause severe losses, however. The symptoms and P.M. appearances are described, and measurements of the parasites given. Trypanblue is without effect in the treatment of *B. bovis*, but urotropine, trypanflavine and acaprin are very useful in the treatment of both diseases if administered in the early stages of the attack. YAKIMOFF has described a type of *Babesia*, resistant to trypanblue and situated in the centre of the red corpuscles, and which he named *Françaiella*. Piroplasms of this appearance having been observed in Rumania, a blood film was forwarded and was confirmed by YAKIMOFF as containing only *Fr.* [= *Babesia*] *caucasica*. Similarly, in another outbreak, a piroplasm was observed resembling that described by SERJENT and other workers in 1926, and was confirmed by DONATIEN as *B. major*. It is intended to carry out further researches on these piroplasms.

III. The author describes a case of anaplasmosis in a native cow, due to *A. marginale*. Recovery took place after treatment with "zotheline". In two separate outbreaks, *Th. mutans* was found associated with *B. bigemina* and *B. berbera* respectively. Symptoms were moderately severe, and the animals recovered without treatment. [The reason for assigning the name *Th. mutans* in place of *Th. annulata* is not clear].

IV. Four tick fevers of cattle are recognized in Algeria, viz :- true piroplasmosis (*B. bigemina* infection) babesiellosis (*B. berbera* infection) anaplasmosis (*A. marginale* infection) and theileriasis (*Th. dispar* infection). Dipping of cattle has not yet proved a practicable measure under local conditions. *Hyalomma mauritanicum*, which transmits *Th.d.*, is found in stables and not on pastures, and considerable protection can be afforded by the proper construction and maintenance of stabling. Injection of trypanblue is very effective in the treatment of true piroplasmosis, and ichthargan in that of babesiellosis. Gonacrine and also acaprin are useful in the treatment of both diseases. No drug has been found effective in the treatment of anaplasmosis or theileriasis; vaccination has proved useful in these diseases and also against babesiellosis. A weak strain of *Th.d.* has been isolated, and is used for the inoculation of cattle; this should be performed during March, as natural cases of infection occur in the summer. Protection against anaplasmosis is afforded by inoculation with *A. centrale*. It is also the custom in Algeria, as a matter of convenience, to include *B. berbera* at the same time in the inoculum. These inoculations are carried out in November, for if they are performed at the same time as those with *Th.d.*, acute attacks are liable to occur. Inoculations have now been carried out for a period of 12 years, on some 20,000 cattle. Losses occurring in the course of vaccination have varied in different years from 0.1% to 1.2%. It is dangerous to inoculate cows of improved breeds during the milking period. Vaccination is best performed on animals under 12 months old, and re-vaccination should be carried out annually.—S. J. GILBERT.

IDNANI, J. A. (1938). *Babesia bovis* Stareovici, 1893, as the Cause of Red-Water in an Indian Buffalo.—*Indian J. vet. Sci.* 8. 99-101. 1 fig. on 1 plate. [4 refs.]

I. records the finding of *B.b.* in the blood of an indigenous buffalo housed with some European cattle. The animal developed haemoglobinuria, which failed to respond to treatment with trypanblue. Blood smears revealed small twin parasites which diverged widely and had a tendency to lie towards the periphery of the invaded cells. They conformed to the description of *B. divergens* as given

by M'FADYEAN and STOCKMAN [(1911). *J. comp. Path.* **24**. 840]. Attempts to transmit the disease to other buffaloes failed.—R. FISHER.

HINDMARSH, W. L. (1937). **Ulcerative Granuloma of Pigs. (Spirochaetal Tumours of Pigs).**—*Vet. Res. Rep., Dep. Agric. N.S.W. 1937*. pp. 64-70. 8 tables. [11 refs.]

This condition is often encountered among pigs in New South Wales principally in those reared under insanitary conditions. The lesions, which are characterized by the presence of ulceration of the skin and tumefaction of the subjacent and surrounding tissues, may be confined to the head (especially about the mouth) in very young pigs, but numerous circular ulcers are found on various parts of the body in older pigs. The predominating organism found in smears is a spirochaete, though its role in the causation of lesions has yet to be determined. Experimental transmission has not been successful. Natural infection appears to occur through various forms of trauma, *e.g.* dental eruptions in young pigs, injuries from barbed wire, etc. Treatment by the injection of an aqueous solution of 5% sodium arsenite into the lesions is effective as a curative measure, but prevention by improved sanitation will often eliminate the disease.—H. B. CARTER.

BAKER, D. W., & STONE, W. S. (1939). **A Study of *Spirillum ovis* Infection [Abortion] in a Group of Ewes Maintained under Observation for Two Successive Lambing Seasons.**—*Cornell Vet.* **29**. 32-34. [6 refs.]

Abortion due to a spirillum was diagnosed in a flock of ewes of which 24 aborted about a month before the full term of pregnancy. Autopsies on the lambs revealed necrotic areas in the liver, resembling the lesions produced by *Histomonas meleagridis* in turkeys. Histological examination of these liver lesions showed narrow areas of necrosis round the blood vessels, and a leucocytic infiltration. Pure cultures of spirilla were isolated from the liver lesions, heart blood and stomach contents of aborted fetuses. Farmers consider that ewes which abort will not breed again, but eight of the affected animals were bought, and served by a young ram next season; all eight lambed normally.—U. F. RICHARDSON.

DELPY, L., & RAFYI, A. (1939). Sur la fièvre récurrente sporadique en Iran. Contribution à l'étude expérimentale de *Spirochaeta persica* Dschunkowsky, 1913. [**Sporadic Recurrent Fever in Iran Caused by *S.p.***].—*Ann. Parasit. hum. comp.* **17**. 45-61. 3 figs., 5 tables. [5 refs.]

Although spirochaetal fever has been encountered several times in Iran amongst visitors to the country, it had not been recognized that a recurrent type of fever, not yielding to quinine, which occurs amongst natives in various areas was due to spirochaete infection. Five cases of infection were detected by microscopic examination of the blood, and an investigation was undertaken into the nature of the organism concerned. The parasite was considered to be *S.p.*, as although it was inoculable into *g. pigs*, it provoked no reaction. Infection was transmitted by *Ornithodoros tholozani*. The organism was inoculable to *g. pigs*, rabbits, rats, sheep and dogs, but in the last two species, although the blood was infective the parasite could not be detected in it. In rats it was found that parasites might persist in the brain for 285 days after recovery, but such persistence could not be detected in other susceptible animals. It is considered that the local persistence of infection is due to survival in the tick species, maintained by occasional infections of man and sheep.—U. F. RICHARDSON.

- I. SMITH, J. (1938). **Leptospiral Infections in Rats. The Presence of Specific Leptospiral Immune Bodies in the Serum and their Relationship to Carrier Conditions.**—*J. Hyg., Camb.* **38**. 521-526. 3 tables. [17 refs.]
- II. SMITH, J. (1938). **Leptospiral Infections in Rats.**—*Rep. med. Offr Hlth, Aberd.* 1937. pp. 6-10. [3 tables.]

I. Rats caught in Aberdeen were killed by coal gas and examined for *L. icterohaemorrhagiae*; those which have been dead a few hours are unsuitable for examination, since the leptospira are destroyed. The kidneys were emulsified in saline and injected into g. pigs, which usually die in 7-12 days if leptospira are present. Blood taken from the heart of the rats was examined for immune bodies. Of 117 rats thus examined, 27.8% harboured virulent leptospira; immune bodies were found in the sera of 23.8% of these and in 17.9% of the group free from leptospira. A positive reaction in dilutions of less than 1:10 does not necessarily indicate a carrier of virulent leptospira. It was noted that the incidence of carriers and positive reactions increased with age.

Thirty-two rat strains from infected g. pigs were cultured and tested against a monovalent rabbit immune serum, but no substantial difference was found. No absorption tests were made.

II. This is the same as I.—H. E. BYWATER.

## DISEASES CAUSED BY VIRUSES

BICHLMAIER. (1938). Maulseuche bei Pferden. [**Transmission of Foot and Mouth Disease to Horses**].—*Münch. tierärztl. Wschr.* **89**. 11-12.

Two horses pastured with affected cattle developed tongue lesions similar to those of F. & M. disease. No lesions, however, were present either on the mucosae of the mouth or lips, or in the feet and hoofs; externally the animals did not exhibit any symptoms of infection.

PICARD, J. H. (1938). Het voorkómen van panaritium en mastitis bij mond-en klauwzeer, door hygiënische en therapeutische maatregelen. [**Foot-Rot and Mastitis in Foot and Mouth Disease**].—*Tijdschr. Diergeneesk.* **65**. 550-555. [English, French and German summaries].

In cattle artificially infected with F. & M. disease, foot-rot and mastitis could be prevented by painting the interdigital space twice daily with a 10% alcoholic solution of iodine, and by washing the teats before and after milking with a 0.5% solution of NaOH.—JAC. JANSEN (UTRECHT).

RICHTER, W. (1938). Maul- und Klauenseuche Uebertragung auf den Menschen. [**Transmission of Foot and Mouth Disease to Man**].—*Arch. Derm., Berl.* **176**. 575-578. 2 figs.

A case record of infection of the mouth of a man by the virus of F. & M. disease transmitted by raw milk. Diagnosis was based on the effect of plantar inoculation of vesicle fluid into a g. pig.—J. E.

- I. DE KOCK, G. (1938). **Foot and Mouth Disease.**—*Fmg S. Afr.* **12**. 337-338.
- II. DE KOCK, G. (1938). **The Slaughter-Out Policy in Foot-and-Mouth Disease Control.**—*Ibid.* 379.

I. Reference is made to the outbreak of F. & M. disease in the Nqutu Reserve in Northern Natal, involving 17,000 cattle, mostly native-owned. The extreme mildness of the symptoms and absence of mortality are mentioned. At

the F. and M. Disease Station at Pirbright, England, it was found that the virus from Rhodesia, where it caused only a very mild disease, produced severe symptoms in English cattle. An appeal was made for the maintenance of the slaughter-out policy. An outbreak of F. & M. disease occurred in cattle at Satara in the Kruger National Park, but the opinion is expressed that it was probably not due to infection from the game.

II. An appeal is made to the stockowners in the Union to assist the Government in the diagnosis of the disease, so that it can be checked before it has become wide-spread. The value of the slaughter-out policy is emphasized, and reference made to the comparatively few outbreaks in Great Britain in 1937, when the disease was rampant on the Continent. Reference is made to the outbreak in cattle in the Kruger National Park.—E. M. ROBINSON.

- I. CAMARA, A. (1938). Les méthodes d'inoculation virulente dans la prévention de la peste bovine. [**Live Virus Inoculation against Rinderpest**].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 2. 1-12.
- II. CURASSON, G. (1938). Notes sur la peste bovine. [**Notes on Rinderpest**].—*Ibid.* No. 3. 1-5. [2 refs.]
- III. MORNET, M. (1938). Vaccination antipestique par le virus bilié. [**Rinderpest Vaccination with Virus in Bile**].—*Ibid.* No. 3. 6-8.
- IV. CHARITAT, M. (1938). Vaccination par le virus pestique saponiné. [**Rinderpest Vaccination with Virus in Saponin**].—*Ibid.* No. 3. 9.

I. This is a discussion of various anti-rinderpest methods, and particularly of serum-virus inoculation, which is considered the best method for use in native areas. 8,777 inoculations carried out in Senegal are reviewed. Clinical reaction following serum-virus inoculation sets in on about the eighth day, but is delayed if virus comes from a donor in which gastro-intestinal lesions have already appeared. Ideally the reaction should be sharp, the febrile stage quickly passed, and no severe lesions produced. If appetite is lost for more than two days, or if diarrhoea commences, serum dosage is recommended, but is regarded as useless if diarrhoea has become profuse and foetid. Calves of a year or so are most susceptible, while very young calves are highly resistant. Abortion as a sequel to double inoculation appears to occur long after all clinical reactions have ceased, and C. moots the possibility that inoculation sets up, in the foetus, a disease process which leads to abortion 30-40 days later. C. considers that reduction of the virus dose from 1 c.c. to 0.5 c.c. produces milder reactions and lessens danger of abortion, without affecting development of immunity.

II. Normal ox bile, diluted 1:20 with saline, sterilized at 120°C., and filtered through a Seitz filter, was mixed in various strengths with the supernatant of a mixture of one part virulent spleen pulp and two parts saline. The mixture was inoculated immediately, or 6 or 12 hours after mixing. Results (on a small number of animals) showed that the bile-treated virus had an immunizing effect in some cases. It is not known whether the bile attenuates or kills the virus, or whether it acts by limiting the field of action of the virus in the body.

Accidents following vaccination and due to tetanus and other spore-borne infections are reported. Spores in accidentally contaminated spleens evidently existed in the vaccine. Deaths from other infections due to lowered resistance following vaccine-virus inoculations are also noted.

Attempts were made to establish the virus of rinderpest in the brain of a mouse (a) by inoculation of a small dose of immune serum prior to intracerebral injection of virus, and (b) by intraperitoneal injection of virus and simultaneous intracerebral injection of starch [see *V.B.* 4: 82]. In neither case was virus recovered from the brain between the fourth and seventh days after inoculation.

III. One part diluted spleen pulp (virulent spleen pulp + 2 pts. saline) mixed with five parts diluted bile (bile and saline 1:10, sterilized at 120°C.) was inoculated into calves in doses of 2 c.c. and 10 c.c. (a) immediately after mixing, and (b) after 12 hours' storage on ice. Of eight animals tested, the blood of one receiving 10 c.c. of the stored mixture, and of one receiving 10 c.c. of the fresh mixture was proved virulent at the height of the reaction, yet these calves again reacted to a test dose of virus given at the 17th day. M. suggests that the virus was not sufficiently established in the body to give an immunity at the time of the test. Calves receiving 10 c.c. immediately after mixing did not develop rinderpest on testing with virus, but calves receiving only 2 c.c., or doses of stored vaccine, developed rinderpest on testing. Two cases were complicated by trypanosomiasis.

IV. Two calves received respectively (a) 2.5 c.c. of a saponin-virus mixture left for 80 minutes and (b) 5 c.c. of a saponin-virus mixture left for three hours. Neither calf reacted, and eight days after vaccination their blood was non-infective. In a second experiment two calves each received 4 c.c. of a saponin-virus mixture left for six hours. High fever and extensive oedema at the inoculation site were evident from the 2nd to the 4th days. The calves of both groups when tested with virulent blood 14 days after vaccination proved immune, while controls developed typical rinderpest.—H. E. HARBOUR.

PHILIPPE, J. (1938). L'intradermoreaction dans la peste bovine. [**Intradermal Test in Rinderpest**].—*Bull. Serv. zootech. Epiz. A.O.F.* 1. No. 4. 1-5. [18 refs.]

After a short review of the literature on allergic reactions in virus infections, P. describes his results with rinderpest, using animals which had been hyper-immunized for serum production. Two types of antigen were used :— (1) From blood, virulent defibrinated blood being mixed with an equal volume of castor oil or glycerin; it gave no reaction in 12 animals. (2) From spleen, which was ground and filtered through two thicknesses of gauze and mixed with an equal volume of castor oil in 0.5 c.c. doses; 21 out of 24 animals gave a positive reaction; no controls were used. The intradermal reaction thus appears to be solely a test of immunity.—S. F. BARNETT.

PFaff, G. (1938). **Rinderpest: The Immunizing Value of Frozen Desiccated Goat Spleen.**—*J. S. Afr. vet. med. Ass.* 9. 188-189. [5 refs.]

Goat vaccine is described; it is made from spleen tissue and used in doses of 0.0025 g. Immunity is established in 48 hours and lasts at least 25 months. The cost worked out at about four shillings per 1,000 doses.—E. M. ROBINSON.

I. FEEMSTER, R. F. (1938). **Outbreak of Encephalitis in Man Due to the Eastern Virus of Equine Encephalomyelitis.**—*Amer. J. publ. Hlth.* 28. 1408-1410. 4 tables, 2 maps. [18 refs.]

II. ANON. (1939). **Equine Encephalitis in Man.**—*Ibid.* 29. 272-274. [8 refs.]

I. The eight original cases were reported from Massachusetts; all were due to the Eastern strain of the virus. The clinical and pathological findings from these cases are described fully, and appear to be characteristic of the disease.

II. Since eight cases of transmission of equine encephalitis to man were reported, further observations on the transmissibility of the disease have been made. Six more cases of human infection have occurred; five of the patients had been in contact with horses, and serum from three of them neutralized the Western strain of the virus. The occurrence of the disease in ring-necked pheasants is reported, and it is suggested that birds are the chief agents of dissemination. This

theory is strengthened by the demonstration of artificial infection in ducks, geese, hawks and other birds, and the recovery of virus from a naturally infected pigeon.—D. D. OGILVIE.

MCKENDRICK, A. G. (1938). **An Eighth Analytical Review of Reports from Pasteur Institutes on the Results of Anti-Rabies Treatment.**—*Quart. Bull. Hlth Org. L.o.N.* 7. 1-42.

The statistics dealt with relate almost entirely to the year 1935, but a few earlier figures are reported. Tables are included giving data for the different methods used and results obtained at the different centres, mortality rate, racial incidence, species of biting animal, severity of bite, position of bite, delay in commencement of treatment, and paralytic accidents following treatment. Comparative percentage mortalities for all previous reviews are given at the end. Separate figures are given for the U.S.S.R.

PETRAGNANI. (1938). Protection contre la rage en Italie. [**Protection against Rabies in Italy**].—*Bull. Off. int. Hyg. publ.* 30. 568-576. 5 tables.

In Italy there are 17 antirabic Institutes and 31 antirabic dispensaries. Except for the four institutes of Bari, Bologna, Naples and Ravenna, where Pasteur's method is still used, phenol vaccine is used all over Italy, and P. devotes much of his article to the advantages in economy, convenience and safety of the phenol vaccine compared with Pasteur's method. Immediately after the war a marked increase in the incidence of rabies was observed; this was counteracted by strong measures against stray and improperly controlled dogs, which resulted in an immediate improvement. Tables and graphs are included; these show the fall in the number of cases treated from 2,156 in 1933 to 1,750 in 1935, and a similar fall in the number of bites reported from 9,000 in 1925 to 5,000 in 1935 (approximate figures). The decrease between 1923 and 1935 in the number of cases diagnosed and the proportion found positive is given in a graph, and the number of stray dogs captured is shown to have fallen from 71,857 in 1930 to 47,744 in 1935. Both the number of cases reported, and the number unsuccessfully treated, show a slight increase in 1935 over 1934.

I. BLANC, G., & MARTIN, L. A. (1937). Recherches expérimentales sur la clavelée et la vaccination anticlaveuse. [**Vaccination against Sheep Pox**].—*Arch. Inst. Pasteur Maroc.* 1. 721-764. 1 fig. on 1 plate, 2 tables, 4 graphs. [18 refs.]

II. BALOZET, L. (1938). Adsorption du virus de la clavelée par l'alumine hydratée. Virulence du complexe. Application à la vaccination. [**Vaccination of Sheep with Sheep Pox Virus Adsorbed on Aluminium Hydroxide**].—*C. R. Acad. Sci., Paris.* 207. 849-851.

I. In order to produce a potent sheep pox antiserum, large amounts of virus are required. BORREL's method [*V. B.* 5. 559.] of injecting virus into the peritoneal cavity produced inconstant results in Moroccan sheep. Attempts to infect monkeys, dogs and g. pigs by the same route were unsuccessful, while rabbits were refractory to intraperitoneal, conjunctival, intracerebral and intrapulmonary injections. The donkey, on the other hand, proved to be susceptible and fairly large amounts of virus could be obtained. The sera of recovered donkeys possessed a relatively high antibody content.

For the vaccination of sheep in the field the authors prepare a mixture of virus with a hyper-immune serum, the value of which has been accurately determined by titrating serial amounts on the skin of sheep. The virus was rendered inert

by bile but the value of such inactivated preparations for immunizing purposes was not tested. Attempts at conserving the virus in the dry state were unsuccessful.

II. Sheep pox virus was adsorbed on aluminium hydroxide. It was found that the virus was so firmly fixed to the gel that it could not be eluted with  $\text{Na}_2\text{HPO}_4$  or NaCl solutions. Sheep inoculated with the aluminium precipitate showed a slight reaction only and were subsequently immune to sheep-pox.—R. E. GLOVER.

- I. DELAGE, B. (1937). Recherches sur le serum sanguin chez la génisse au cours de la maladie vaccinale. [**Chemical Composition of Bovine Serum following Infection with Vaccine Virus**].—*Bull. Soc. Chim. biol., Paris*. 19. 1407-1418. 5 tables. [4 refs.]
- II. AKAZAWA, S., & HOTTA, T. (1938). **Experiments on Animals with the Small-Pox Virus with Special Reference to Vaccination**.—*J. Jap. Soc. vet. Sci.* 17. 241-255 of pt. 1. 8 figs. on 2 plates, 1 chart. [9 refs.] [In Japanese : abst. from English summary pp. 112-113 of pt. 2].

I. The blood sera of cattle which had received large doses of vaccine virus by the intradermal route, were examined chemically at varying intervals after infection. The levels of urea, chloride and total protein remained reasonably constant, but the lipoids showed a very regular reduction to about a half the usual amount. The loss was related chiefly to the unsaponifiable fractions and not to the fatty acids.

II. Material from two smallpox patients was successfully transmitted to the monkey, rabbit, dog and g. pig, whereas calves, sheep and cockerels were not affected. After passage through rabbit testicles the virus produced lesions on the skin of calves.—R. E. GLOVER.

- HAMMON, W. D., & ENDERS, J. F. (1939). **A Virus Disease of Cats, Principally Characterized by Aleucocytosis, Enteric Lesions and the Presence of Intranuclear Inclusion Bodies**.—*J. exp. Med.* 69. 327-352. 6 figs. on 1 plate, 6 tables. [12 refs.]

An acute rapidly fatal epizootic disease of cats is described. Initial signs are limited to anorexia, weakness, and occasional vomiting, but a moderate fever and a leucopenia rapidly intervene. The latter is of such severity that in many cases no leucocytes can be detected in the blood shortly before death. Autopsy shows little of note except slight inflammation of the small intestine, and marked softening of the marrow of the long bones. Under the microscope intranuclear inclusions are conspicuous in the cells of the intestinal mucosa, and in the mononuclear cells in the spleen and lymph nodes. Marked aplasia of the cellular elements of the bone marrow is also characteristic.

The disease, which appeared in the first instance as an enzootic amongst laboratory cats, was studied experimentally by the inoculation of bacteria-free filtrate of spleen emulsions of infected cats into healthy cats. The mortality was high in the test cats. A few, however, showed no indication of illness other than moderate leucopenia, and it is thus possible that a mild infection may occur naturally.

Experimental and collateral evidence indicate that a filterable virus is the most probable cause. Inoculation into experimental animals has shown that the pathogenicity of the infective agent is confined exclusively to cats.

A comparison is drawn between the disease under investigation and cat distemper. It is suggested that the main points of differentiation lie in the mildness of the intestinal injury, the presence of inclusion bodies and the leucopenia.

—D. D. OGILVIE.

HURST, E. W. (1988). **Myxoma and the Shope Fibroma. 5. Myxoma in the Fibroma-Immune Rabbit, with a Summary of Present Knowledge of the Relationship between Myxoma and Fibroma Viruses.**—*Aust. J. exp. Biol. med. Sci.* **16**. 205-208. [15 refs.] [See also *V. B.* **9**. 891].

H. describes the histological changes observed in 12 rabbits infected intradermally with myxoma at intervals of 2-65 days after inoculation with fibroma virus. The disease produced was clinically and pathologically recognizable as myxoma, but differed from that in animals not immune to fibroma in that it exhibited many of the features of an allergic reaction, and also in the lack of histological changes in the spleen and distant lymph nodes.

GILDMEISTER, E., & AILFELD, I. (1988). Ueber eine bei der weissen Maus spontan aufgetretene Meningo-Enzephalomyelitis. [**Spontaneous Meningo-Encephalomyelitis in White Mice**].—*Zbl. Bakt. I. (Orig.)*. **142**. 144-148. 8 figs., 2 tables. [5 refs.]

The report of a spontaneous outbreak of a disease in white mice which was characterized by bilateral posterior paralysis followed by death in 3-26 days. Histological examination revealed the presence of a meningo-encephalomyelitis and associated necrosis of ganglion cells. The cause was shown to be a filtrable virus and the disease could be reproduced by the intracranial inoculation of brain filtrate. The virus could be demonstrated for some time after in the brains of animals which survived attacks of the disease, so that recovered carriers probably play a big rôle in the spread of this disease.—E. J. PULLINGER.

PIGOURY, L., & BERNARD, M. (1989). Existence de *Rickettsia canis* dans le proche-orient. [**Existence of *R.c.* in the Near East**].—*Bull. Soc. Path. exot.* **32**. 19. [1 ref.]

Attempts to demonstrate *R.c.* infection of dogs in Beyrouth were made from 1937 onwards. No infection could be detected in dogs brought for general treatment, but out of 46 stray animals destroyed, one showed inclusion bodies in the monocytes of the lungs, similar in morphology and staining characteristics to *R.c.* as described by DONATIEN and LESTOQUARD [*V. B.* **8**. 354].—U. F. RICHARDSON.

ZINSSER, H., FITZPATRICK, Florence, & WEI, H. (1989). **A Study of *Rickettsiae* Grown on Agar Tissue Cultures.**—*J. exp. Med.* **69**. 179-190. 3 charts. [11 refs.]

Tissue cultures by the Maitland method has been used successfully in vaccination against the European type of typhus, but for large scale vaccine preparation, the method is slow and difficult. It was found that the optimum conditions for the development of rickettsia were provided when tissue cells could be preserved viable for 10 days without too active metabolism. Agar slants were prepared by mixing equal quantities of 8% agar with a Tyrode-serum mixture (800 c.c. double strength Tyrode solution, 200 c.c. horse serum and 16 c.c. of 0.04% solution of phenol red). The water of condensation was removed by pipette, and sterile minced tunica vaginalis of a g. pig gently laid on the surface of the agar slant, so that about 1/3 of the surface was covered.

For examination of cultures for rickettsia, smears were stained with 0.25% basic fuchsin, which was washed off with 0.5% citric acid; the smears were then counterstained with 1% aqueous solution of methylene blue for 10 seconds. The rickettsia stain red and the cell elements blue.

Inoculation of g. pigs with such cultures has always produced typical and severe febrile reactions and 18 out of 18 animals later proved immune to inoculation

with typhus virus. Vaccines prepared by treating the cultures with formalin or phenol gave g. pigs complete immunity or increased resistance. The cultures gave a much better yield of rickettsia than Maitland cultures.—U. F. RICHARDSON.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

HEARLE, E. (1938). **Insects and Allied Parasites Injurious to Livestock and Poultry in Canada.**—*Fmr's Bull. Dep. Agric. Can.* No. 53. pp. 108. 88 figs.

This is intended to replace a previous bulletin (No. 29, 1923). It embodies recent advances in knowledge of this subject, largely based on H's late studies and investigations, and is prepared to serve the needs of livestock owners in all parts of the Dominion. It is profusely illustrated, and commences with reasons for, and general methods of, control; the role of insects as carriers of worms is mentioned, with reference to the dung beetle. Sections devoted to flies occupy nearly half the bulletin, the remainder deals with ticks, lice, mange and other mites, and is followed by a "Monthly Program of Live Stock Insect and Arthropod Control".—C. MACKIE.

HINDMARSH, W. L., & BELSCHNER, H. G. (1937). **Studies on Cutaneous Myiasis (Blowfly Strike) of Sheep. I. Glycerine Diborate as a Preventive of Blowfly Strike of Sheep.**—*Vet. Res. Rep., Dep. Agric. N.S.W.* 1937. pp. 41-48. 8 tables. [2 refs.]

BELSCHNER, H. G., & HINDMARSH, W. L. (1937). **Studies on Cutaneous Myiasis (Blowfly Strike) of Sheep. II. The Ingestion of Boric Acid as a Means of Prevention of Blowfly Strike in the Breech Region.**—*Ibid.* pp. 44-48. 1 table. [8 refs.]

BELSCHNER, H. G., & HINDMARSH, W. L. (1937). **Studies on Cutaneous Myiasis (Blowfly Strike) of Sheep. III. The Operative Procedure for the Control of Blowfly Strike of the Breech of Sheep (Mules' Operation).**—*Ibid.* pp. 49-57. 8 tables. [5 refs.]

I. The trial suggests that a glycerine diborate preparation may be valuable as a dressing for the prevention of blowfly strike in sheep. Since the experiment was conducted in a year when blowfly strike was moderate it is not known whether this treatment would be useful when fly attack is severe.

II. Boric acid administered in the drinking water had no apparent value in preventing blowfly strike in sheep. No ill effects on body weight or general health were observed.

III. The experiment showed clearly that the surgical removal of folds from the breech does render sheep less liable to blowfly strike in that region of the body. The authors consider that the gradual reduction of breech wrinkles by breeding is the more desirable method of lowering susceptibility to blowfly strike.—H. B. C.

SONI, B. N. (1938). **Observations on the Bionomics of the Ox Warble-Fly (*Hypoderma lineatum* de Villiers).**—*Indian J. vet. Sci.* 8. 375-380. 3 figs., 2 tables. [6 refs.]

Observations were made on *Hypoderma lineatum* at Muktesar in the Kumaun Hills at an altitude of 7,500 feet. This species must be indigenous, as cattle bred in the district were found to be infested with the grubs. In hill bulls, the infestation exceeded 50%. Oesophageal forms of the larvae were found continuously from March to October; this observation does not support the view that there is only

one annual brood of *H. lineatum* in India. Records of body weights indicated that the presence of warble tumours causes loss of condition in affected animals.

—R. P. HOBSON.

GUNN, W. R. (1938). [Report on] Warble-Fly and Tick Control-Work [In British Columbia, 1937].—*Rep. Dep. Agric. Brit. Columbia, 1937.* pp. K67-K68.

A review on warble-fly control in British Columbia by treatment (undisclosed) during 1937 in which satisfactory progress is reported. In the control of the wood tick (*Dermacentor andersoni*) and the winter tick (*D. albipictus*) the use of "standardized Derris" was found to be more efficacious, particularly against the winter tick, than insecticides previously used.—L. M. HEATH.

POPESCU-BARAN, M. (1939). Presence de larves d'*Hypoderma bovis*, au second stade d'évolution, dans le canal rachidien de la génisse. [The Presence of Second Stage Larvae of *Hypoderma bovis* in the Spinal Canal of a Heifer].—*Rev. Med. vet., Bucuresti.* 51. 44-46. [In French].

Larvae found in the spinal canal of a heifer were identified as second instar larvae of *Hypoderma bovis*. Except for one previous record of the presence of second instar larvae in the spinal canal of an ox, little is known of the early stages of larvae of this species. This discovery is held to confirm the theory that the larvae are ingested and do not perforate the skin.—R. P. HOBSON.

ABDUSSALAM, M. (1939). The Occurrence of Equine Nasal Bot, *Rhinoestrus Purpureus* (Brauer, 1858) in India.—*Vet. J.* 95. 36-38. [11 refs.]

Larvae of *Rhinoestrus purpureus* were found in the nasal sinuses of a donkey. This appears to be the first record both of this species as a parasite of the donkey and of the occurrence of the genus *Rhinoestrus* in India. Since in this case the host was born locally, the fly is presumably able to breed in India.—R. P. HOBSON.

WELLS, R. W., & KNIPLING, E. F. (1938). A Report of Some Recent Studies on Species of *Gastrophilus* Occurring in Horses in the United States.—*Iowa St. Coll. J. Sci.* 12. 181-203. 17 figs. [12 refs.]

Keys are given for the identification of first and second instar larvae and adults of the four species of *Gastrophilus* known to infest horses in the United States. The biology of the three principal species, *G. nasalis* L., *G. intestinalis* De Geer and *G. haemorrhoidalis* L., is described, an account being given of the data available and the author's observations on the following points:—seasonal activity of adults, mating and oviposition, incubation period and hatching, larval movements and development, and pupation. In the case of *G. intestinalis*, observations were made on the endurance of the larva within the eggshell, the seasonal occurrence of larvae in the tongue of the horse, and the use of chemicals as a substitute for the warm-water method of destroying the eggs. Washes containing phenol or cresol proved ineffective, but an oil derived from the distillation tars of corn-cobs was found to kill more than 90% of the eggs. Special methods are described for collecting *Gastrophilus* eggs and for transplanting immature larvae into living horses.—R. P. HOBSON.

CAUSEY, O. R. (1938). Experimental Intestinal Myiasis.—*Amer. J. Hyg.* 28. 481-486. 1 table. [5 refs.]

In view of numerous cases of digestive disturbance in man attributed to intestinal myiasis, tests were made by feeding of the following to dogs and cats:—

*Drosophila melanogaster*, *Lucilia sericata*, *Phormia regina*, *Cochliomyia macellaria*, *Sarcophaga securifera* and *Calliphora erythrocephala*. In no case could living larvae be discovered afterwards in the large intestine or faeces. C. concludes that these fly larvae do not produce symptoms such as have been attributed to them.

—M. L. BINGHAM.

SYBESMA, R. P. (1938). Schurftbestrijding bij onze huisdieren. [**Sarcoptic Mange in Domestic Animals**].—*Tijdschr. Diergeneesk.* 65. 158-163. [English, French and German summaries].

S. states that sarcoptic mange is common in animals in the Netherlands. He also states that it is a menace to human beings, though no evidence is given to support this statement. He describes treatment of animals with a commercial petroleum product.—JAC. JANSEN (UTRECHT).

ABDUSSALAM, M. (1939). On a New Feather Mite Parasitic on the Indian Domestic Fowl (*Gallus Bankiva Murghi*).—*Vet. J.* 95. 39-42. [7 refs.]

A. states that the mite is a species of the genus *Rivoltasia*; he calls it *Rivoltasia karamellahiei*, and gives a description of the male and female. No ill effects were observed in the chickens infested. The mite was discovered in Muktesar, in the Kumaon Hills, India.—A. L. WILSON.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

I. SCHMID, F. (1938). Parasitäre Aufzuchtkrankheiten und ihre Bekämpfung. [**Control of Diseases of Young Stock Due to Parasites**].—*Dtsch. tierärztl. Wschr.* 46. 785-787.

II. SCHMID, F. (1938). Therapie des parasitären Krankheiten der Haustiere. [**Therapy of Parasitic Diseases in Domestic Animals**].—*Ibid.* 760-762.

I. A brief account of the parasitic diseases of young stock.

II. A general discussion of the more common parasitic diseases and their treatment.—A. L. WILSON.

RAYSKI, C. (1938). Przyczynek do znajomości robaków pasożytniczych lisów srebrzystych w Polsce. [**Parasitic Worms of Silver Foxes in Poland**].—*Wiad. weteryn.* 17. 281-290. 1 table. [12 refs.] [French summary].

Silver fox farming is rapidly developing in Poland, and severe losses are caused by helminth infestation. The following were the results of the examination of 45 silver foxes:—*Toxocara canis* in 33 foxes, *T. mystax* in 3, *Uncinaria stenocephala* in 25, *Capillaria plica* in 1, and *Metorchis albidus* in 20. R. discusses the customary control measures.

GEBAUER, O. (1939). Statistische Beobachtungen über den Milchertrag während einer Leberegelseuche. [**Milk Yield (of Cattle) During Liver Fluke Infestation**].—*Wien. tierärztl. Mschr.* 26. 33-38. 6 graphs.

G. discusses the loss of milk yield in cattle caused by infestation with liver flukes, and states that this loss can be as much as 15%.—A. L. WILSON.

GANSLMAYER, R. (1938). Rezultati terenskih pokusa sa bakrenim sulfatom obzirom na djelovanje na metiljskog puza. [**Results of Copper Sulphate Spraying of Land Infested with Liver Fluke Snails**].—*Vet. Arhiv.* 8. 198-225. 12 figs. [German summary]. [See also *V. B.* 8. 708].

Fifty-seven field experiments were made with copper sulphate against liver

flake snails. It was observed that the character and area of the land was a factor demanding consideration when preparing copper sulphate solutions. For 1 hectare of land, 80 kg. copper sulphate are required if to be used as a 1-4% spray, and 45 kg. if scattered as a powder consisting of six parts of sand to one of copper sulphate. The total cost would amount to between 19s. and 80s. per hectare in Yugoslavia. As a rule the concentration obtained in marshes must not fall below 1:25,000 in places with an abundant vegetation, or 1:50,000 in barren areas.

—B. OSWALD (KRIŽEVCI).

LAVIER, G., LEROUX, R., & CALLOT, J. (1988). Un cas de cancer multicentrique du foie associé à la distomatose hépatique chez un mouton. [**Carcinoma Associated with *Fasciola* and *Dicrocoelium* Infestation of the Liver in a Sheep**].—*Ann. Parasit. hum. comp.* 16. 424-428. 2 text figs., 1 fig. on 1 plate. [14 refs.]

The authors review the literature associating neoplasms with parasitism of the liver of cattle and sheep. The article concerns a sheep's liver of which parts were enlarged and studded with small nodules. The large bile ducts contained several *Fasciola* and all the small ducts appeared to contain *Dicrocoelium*.

The authors conclude that the *Dicrocoelium* are more likely to have been cancer-producing than the *Fasciola*. [The organ was examined without any knowledge of the sheep's history; as the liver is so often passaged by other parasites, especially larval forms, the assumptions outlined in the article scarcely seem warranted].—C. V. WATKINS.

SEYFARTH, Martha. (1988). Pathogene Wirkung und innerer Bau von Paramphistomum cervi. [**Pathogenic Action and Inner Structure of *Paramphistomum cervi***].—*Dtsch. tierärztl. Wschr.* 46. 515-518. 7 figs. [6 refs.]

A large number of parasites was found in the rumen of a calf, and the wall of the organ was inflamed. Other calves in the same herd had become so emaciated as a result of infestation with this parasite that they had to be destroyed. The author describes the digestive, excretory and reproductive systems of the parasite.

—A. L. WILSON.

- I. BHALERAO, G. D. (1987). **Schistosomes and Schistosomiasis in India.**—*Papers on Helminthology commemorating 30 year jubilee of K. J. Skrjabin*. pp. 47-54. [Numerous refs.] [In English: Russian summary]. Moscow: Lenin Acad. Agric. Sci. [Reprinted in *Indian J. vet. Sci.* 8. 149-157].
- II. DOWDESWELL, R. M. (1988). **Schistosomiasis in the Kavirondo District of Kenya Colony.**—*Trans. R. Soc. trop. Med. Hyg.* 31. 678-688. 2 text figs., 2 figs. on 1 plate, 5 tables. [Numerous refs.]

I. A short résumé is given of the work done in India on schistosomes and schistosomiasis. The condition occurs in ruminants, horses, pigs and dogs in India. The intermediate hosts of the parasites, the larval forms, medicinal treatment, immunity, and pathogenicity, are discussed.

II. Central Kavirondo is an area with a particularly high incidence of human infestation with these parasites. The disease is not known to occur in domestic animals in this district, and, indeed, only two cases have been recorded from the whole of the colony. D. records the discovery of the molluscan hosts of *S. haematobium* in Kavirondo. *S. bovis* was encountered in the course of the researches, and its intermediate host was found to be *Physopsis nanuta*. Furcocercariae obtained from this snail were allowed to infect mice, which on being killed 60 days later were found to contain many adult *S.b.* The characteristic

lesion was a tumour-like mass in the bladder; this may indicate that the parasite is capable of affecting the genito-urinary system.

No ova of *S.b.* were found, however, on examination of numerous samples of urine from human beings.—D. D. OGILVIE.

CIUREA, I. (1984). Recherches expérimentales sur la réceptivité des oiseaux domestiques à l'infestation par les trématodes de la famille "Heterophyidae" Odhner. [**Susceptibility of Domestic Birds to Infestation by Trematodes of the Family Heterophyidae**].—*Mém. Prof. Jean Cantacuzene*. pp. 169-183. 5 figs. on 1 plate. [3 refs.] Paris: Masson et Cie.

Experiments to determine the receptivity of domestic birds to trematodes from fish were carried out on hens, guinea fowl, turkeys, ducks, geese and pigeons. The fish used came from the Danube, the Dniester and the Black Sea, and the birds were infested by giving them small whole fish or their various organs to eat, or by force-feeding them. The number of metacercariae in the fish were not estimated before feeding them to the birds.

Results showed that pigeons could be infested by all the trematodes fed to them, viz:—*Metagonimus romanicus*; *Apophallus muhlingi*; *Rossicotrema donicum*; *Cryptocotyle concavum*, and *Pygidioopsis genata*. Hens and turkeys could be infested with *Cryptocotyle concavum*, but only for a few days. Guinea-fowl could be infested with *Cryptocotyle concavum*, *Pygidioopsis genata* and *Parascocotyle sinoecum*, and ducks and geese with *Cryptocotyle concavum* and *Pygidioopsis genata*. It is suggested that receptivity or non-receptivity to infestation should not be considered as being due to immunity or resistance to infection, but rather to the chemical metabolism of the digestive tract which may vary in different species of birds.

The trematodes from the Danube fish were most often found in the posterior third of the intestine of the birds, those from the Black Sea fish were most often found in the anterior and middle thirds.

I. PARLIER. (1988). La laderie bovine à Dakar. [**Bovine Cysticercosis at Dakar, Senegal**].—*Rev. Méd. vét., Toulouse*. 90. 504-515. 1 table.

II. ENDREJAT, E. (1988). Statistisches über die Rinderfinne im Iran. [**Statistics of Bovine Cysticercosis in Iran**].—*Dtsch. tierärztl. Wschr.* 46. 472.

I. Tapeworms are more frequent in the natives than in Europeans, despite the fact that all native food is subject to long cooking. About 2% of cattle are infested with cysts due to pasturage in the neighbourhood of native dwellings where contamination with human faeces is high. Control is effected by:—(1) inspection of carcasses and total condemnation if the cysts are generalized; (2) roasting of the meat until the whole flesh becomes greyish-red in order to kill all cysts (cysts are killed at temperatures above 48°C.), and (3) teaching the natives hygienic disposal of faeces.

II. About 7% of inspected cattle were found affected. Sites in order of frequency were:—masseters, lungs, heart, and intercostal, shoulder, and thigh muscles. The incidence is high despite the thorough cooking of food and the teaching of public hygiene. Control is by:—(1) inspection and partial or total condemnation of affected meat, since sterilization by heat, pickling or freezing cannot be used, and (2) treatment of human tapeworm carriers.—S. F. BARNETT.

BEARUP, A. J., & MORGAN, E. L. (1989). The Occurrence of *Hymenolepis diminuta* (Rudolphi, 1819) and *Dipylidium caninum* (Linnaeus, 1758) as Parasites of Man in Australia.—*Med. J. Aust.* Jan. 21st. 104-106. 1 table. [Numerous refs.]

Three additional cases of *H. diminuta* infestation of man are reported. Two

cases of *D. caninum* infestation are recorded and are thought to be the first described from man in Australia. References to *D. caninum* in man have been collected.

—H. McL. GORDON.

NOSIK, A. F. (1987). K voprosu ob ustoičivosti ličinočnyh (puzyrnyh) form chinokokka k vozdeistviu nekotoryh fizičeskih i himičeskih faktorov. [On the Resistance of Larval Echinococci against Some Physical and Chemical Agents].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skrjabin*. pp. 427-428. Moscow: Lenin Acad. Agric. Sci.

As a result of his experiments, N. concludes that *Echinococcus* has little resistance to salting, desiccation, and hot and cold water.

- I. ROUBAUD, E., & DESCHIENS, R. (1989). Capture de larves infestieuses de nématodes pathogènes par des champignons prédateurs du sol. [Capture of Infective Larvae of Pathogenic Nematodes by Parasitic Fungi of the Soil].—*C. R. Acad. Sci., Paris*. 208. 245-247. [5 refs.]
- II. ROUBAUD, E., & DESCAZEUX, J. (1989). Action de certains champignons prédateurs sur les larves des strongylidés du cheval. [Action of Certain Predatory Fungi on the Larvae of Equine Strongyles].—*Bull. Soc. Path. exot.* 32. 290-294. 2 figs. on 1 plate. [2 refs.]
- III. COMANDON, J., & DE FONBRUNE, P. (1989). De la formation et du fonctionnement des pièges de champignons prédateurs de nématodes. Recherches effectuées à l'aide de la micromanipulation et de la cinématographique. [Function and Formation of Fungi Traps Pathogenic for Nematodes. Use of Micromanipulation and the Cinematograph in their Study].—*C. R. Acad. Sci., Paris*. 208. 804-805. [3 refs.]

I. Since various soil fungi are known to capture and digest free-living rhabditid larvae, the authors wanted to ascertain if such fungi have the same action on parasitic nematode larvae. They found that when larvae of *Strongyloides fülleborni* (from chimpanzees) and *Ancylostoma duodenale* were placed in a Petri dish of sterile gelatine on which the fungi were cultured, the larvae were engulfed and digested by the mycelium. Application of these results to the destruction of parasitic nematode larvae in manure is suggested.

II. The fact that the free-living larvae of species of *Ancylostoma* and *Strongyloides* can be captured and destroyed by the fungi *Arthrobotrys* and *Dactyella* was used as a basis for similar experiments with the strongyle larvae of the horse. The larvae, which were obtained from cultures of strongyle eggs in finely powdered charcoal, were placed with the fungus on nutritive gelatin at 18°C. It was found that *D. bembicoides*, *D. ellipsospora* and *A. oligospora* can capture and digest the strongyloid larvae of *Strongylus* and *Trichonema* genera to a variable degree. It is suggested that a new biological method of control against parasitic nematodes can be based on the utilization of these predatory agents.

III. Micromanipulation of the surface of fungi traps with a blunt needle causes a swelling of the surface cellules and an alteration in osmotic pressure, or, in some cases, the production of a sticky substance at the point of irritation. The characters of these phenomena can be recorded with the cinematograph.

—M. L. BINGHAM.

WETZEL, R., & ENIGK, K. (1987). Ein weiterer Beitrag zur Lungenwurmtauna des Hochwildes. [The Lungworms of Game Animals (*Dictyocaulus*)].—*S.B. Ges. naturf. Fr. Berl.* Jan. 19th. 9-10. [5 refs.]

The authors state that *D. filaria* occurs very rarely in deer and is probably introduced by sheep. They describe the occurrence of *D. viviparus* in several bison.—A. L. WILSON.

HUYGHENS, F., & LEFEVRE, A. (1988). La bronchite vermineuse. [**Vermineous Bronchitis**].—*Ann. Méd. vét.* **83**. 145-156.

A conventional account of the subject.—C. V. WATKINS.

DAVTJAN, E. A. (1937). K izuceniiu biologii legočnogo gelmintia ovec i koz *Synthetocaulus kochi* Schulz, Orloff et Kutass, 1933. [**A Study of the Life-Cycle of *Synthetocaulus kochi* Schulz, Orloff and Kutass, 1933, the Lungworm of Sheep and Goats**].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin*. pp. 105-122. 4 figs., 3 tables. [5 refs.] Moscow : Lenin Acad. Agric. Sci.

The incidence of *Synthetocaulus* in Armenia is high compared with that of *Dictyocaulus*. Infective larvae can survive for as long as four months outside the host. Exposure to a temperature of from  $-6^{\circ}$  to  $-10^{\circ}\text{C}$ . kills them in five days, but heating to  $50-60^{\circ}\text{C}$ . kills them in 30 minutes. They show a high resistance to desiccation; dried on a watch glass they are viable for 120-122 days at room temperature ( $18-25^{\circ}\text{C}$ .) and for 30-32 days at  $37.5^{\circ}\text{C}$ . Pellets of faeces containing infective larvae dried at  $37.5^{\circ}\text{C}$ . still contain viable larvae after 100 days. Direct sunlight ( $35-52^{\circ}\text{C}$ .) kills desiccated larvae in 5-8 hours; larvae in a moist medium ( $30-42^{\circ}\text{C}$ .) are stimulated in the first hours to active mobility, but they die in from 6-10 hours.

The authors found the resistance of *Synthetocaulus* larvae to chemical agents to be comparatively high; they give figures showing the relative resistances of *Synthetocaulus* and *Dictyocaulus* larvae to various agents.

Experiments on direct infection (*per os*) of rabbits with *Synthetocaulus* larvae gave negative results; the larvae passed through the bowels unchanged, emerging in a viable condition.

Snails of the genera *Helix*, *Limax*, *Burinus* and *Hyalina* are the intermediate hosts of *Synthetocaulus*, and the development of the larvae in this host takes some 35-60 days.

TRAVASSOS, L. (1937). Revisão da familia Trichostrongylidae Leiper, 1912. [**Revision of the Family Trichostrongylidae**].—*Monogr. Inst. Oswaldo Cruz*. No. 1. pp. vii + 512. 297 plates. [Numerous refs.] Rio de Janeiro : Instituto Oswaldo Cruz. [4to].

T. has revised and modified previous publications on this family; papers already published in the *Memorias do Instituto Oswaldo Cruz* on *Haemonchus* and on *Trichostrongylus* have not been repeated, but references to them are given in the appropriate places. The system of nomenclature is given shortly, followed by descriptions of the worms. Nearly half the book is made up of drawings of the worms, a bibliography, and an index.

HABERER, C. (1988). La strongylose gastrique du cheval. *Trichostrongylus axei* (Cobb.). [**Gastric Infestation of Horses with *Trichostrongylus axei***].—*Thesis, Alfort*. pp. 58. 2 figs. [Numerous refs.]

A general account of the condition.—A. L. WILSON.

CHANDLER, Asa C. (1988). Further Experiments on Passive Immunity of Rats to *Nippostrongylus* Infections.—*Amer. J. Hyg.* **28**. 51-62. 2 figs., 2 tables. [9 refs.]

Rats were repeatedly exposed to large numbers of *Nippostrongylus* larvae by

skin penetration or subcutaneous inoculation, and it was found that when their serum was injected intraperitoneally into young rats, worms from a test infection were markedly inhibited in egg production and slightly dwarfed in size. The serum had very little effect on the larvae which had already reached the intestine and passive immunity did not last for longer than two weeks. Subcutaneous inoculation of living larvae was more effective than the skin penetration method in producing an antiserum, but inoculation of killed larvae introduced by the same route was not effective. The immunity is directed against metabolic products of the larvae rather than against the larvae themselves.—A. L. WILSON.

OTTO, G. F., & KERR, K. B. (1939). **The Immunization of Dogs against Hookworm, *Ancylostoma caninum*, by Subcutaneous Injection of Graded Doses of Living Larvae.**—*Amer. J. Hyg. Sect. D.* **29.** 25-45. 2 tables, 4 graphs. [Numerous refs.]

Three litters of dogs, a total of 10 animals, were used to demonstrate the difference between the active immunity to the hookworm resulting from serial light infections in puppyhood and the partial refractoriness of mature dogs to initial infections. At autopsy many more parasites were found in the unprotected controls than in the dogs actively immunized as puppies. Furthermore, with one exception, the unprotected controls all succumbed to the experimental infections, whereas the actively immunized animals were scarcely affected. The authors conclude that maturity and general good health are essential for the host to respond fully and quickly to the stimulus provided by invading worms.—A. L. WILSON.

ERSOV, V. S. (1937). K voprosy o borjbe so strongyloidozom teljat jagnjat, porosjat i zerebjat. [**Control of Strongyloidosis of Cattle, Sheep, Pigs and Horses**].—*Papers on Helminthology Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin.* pp. 155-159. 1 table. Moscow: Lenin Acad. Agric. Sci. A general account of *Strongyloides* infestation; there is no new material.

BARNET, G. (1937). Un cas de sétariose oculaire. [**A Setaria in the Eye of a Mule**].—*Rev. Méd. vét., Toulouse.* **89.** 224-226.

A male *S. equina* 5 cm. long was removed from the anterior chamber of the right eye of a mule in Algeria. B. speculates as to the way in which the worm penetrates the aqueous humor. The life-history of the worm is unknown.

HUTSON, L. R. (1938). **Some Observations on Manson's Eyeworm of Poultry in Antigua, B. W. I., and a Suggested Method of Control.**—*Trop. Agriculture, Trin.* **15.** 66-68. 2 tables. [3 refs.]

Removal of the membrana nictitans of chickens as a method of control of *Oxyuris mansoni* has given promising results. Membranectomized and control birds were infected by placing larvae in the eyes, or feeding with larvae or infested cockroaches. Adult worms were recovered from all of the controls, but the membranectomized birds remained uninfected. Mature adult worms set up considerable irritation in the eyes of the treated birds, but disappeared within 24 hours.—D. D. OGILVIE.

## IMMUNITY

FOLLIS, R. H., Jr. (1938). **Immunizing Effect of Old Tuberculin on Experimental Tuberculous Infection.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 45-48. [8 refs.]  
Thirty g. pigs were divided into three groups; 10 were inoculated with old

tuberculin, 10 with synthetic medium (*i.e.*, medium only), and 10 were untreated. All the g. pigs then received inoculations of virulent tubercle bacilli. The tuberculin treated g. pigs did not react to the tuberculin test 42 days later, whereas the animals in the other two groups gave positive reactions. G. pigs of all groups were found to be affected to the same extent when killed. Old tuberculin conferred no demonstrable immunity.—J. REID.

I. PARISH, H. J. (1938). **The Modern Outlook on Tuberculin.**—*Tubercle, Lond.* **19**. 337-350. [Numerous refs.]

II. BUNNEY, W. E., & GOTTSCHALL, R. Y. (1938). **The Standardization of Diluted Tuberculin.**—*Proc. Soc. exp. Biol., N.Y.* **39**. 71-75. 1 table. [8 refs.]

I. This valuable article is essentially a critical review which does not lend itself to abstraction and should, therefore, be read in the original.

P. summarizes recent investigations into the preparation and purification of tuberculin with special reference to P.P.D., and indicates the advantages of the latter as a diagnostic agent in man. The tuberculin test in cattle and pigs using synthetic medium products is also mentioned, together with a brief summary on the experimental investigation into BCG and Spahlinger vaccine in both man and cattle.

II. With the object of detecting loss in potency of 1:10,000 dilutions of synthetic medium tuberculin, B. has devised a slightly more sensitive test than those used by EAGLETON and BAXTER [(1923). *Brit. J. exp. Path.* **4**. 289.] and by DOUGLAS and HARTLEY [*V.B.* **5**. 568]. G. pigs weighing from 700-1,400 g. were selected and were sensitized with 0.5 mg. of *Mycobact. tuberculosis* H.37. The animals attained maximum sensitivity after four weeks and reacted to dilutions of tuberculin varying from 1:10,000 up to 1:80,000 or even higher. It is claimed that with these extremely allergic animals it is possible to detect differences in potency of 20% as compared with the standard.—R. E. GLOVER.

FELDMAN, W. H., & FITCH, C. P. (1937). **Development of Local Cellular Reaction to Tuberculin in Sensitized Calves.**—*Arch. Path.* **24**. 599-611. 10 figs. [7 refs.]

A detailed study of the histological changes produced by intradermal injection of tuberculin into the caudal folds of nine calves artificially infected with virulent bovine tubercle bacilli. Sections of caudal fold were taken for examination at intervals up to 28 days after inoculation.

The main changes noted were perineural and perivascular cellular reactions, oedema, thrombosis and endarteritis, with pronounced infiltration of polymorphonuclear leucocytes in the early stages of reaction, these being later replaced by eosinophils, histiocytes or mononuclear lymphocytes. Evidence of reaction was found to be still present 28 days after inoculation.

Intradermal injection of tuberculin into the caudal folds of non-sensitized calves did not produce any demonstrable reaction.—H. BURROW.

I. BELLE, G. (1938). Quel protocole adopter pour les tuberculinations à dose double? [**The Reading of the Tuberculin Test Using Double the Usual Dose**].—*Bull. Acad. vét. Fr.* **11**. 487-489.

II. BELLE, G. (1938). Remarques à propos de l'injection de tuberculine à dose double. [**Tuberculin Tests Using Double the Usual Dose**].—*Maroc méd.* **18**. 384-386.

I. From the intensity and duration of the reaction in 386 positively reacting

cattle injected with double the usual dose of tuberculin [apparently the subcutaneous test], B. considers that this is preferable to the usual dose, and that the injection is best given at 10 p.m., the test being read at 6 a.m.

II. This article expands I [above] and gives graphs to show that :—(a) the reaction usually occurred by the 10th hour after injection ; (b) the duration of the temperature rise rarely exceeded eight hours ; (c) the rise was usually between 1.5° and 2.5°C. ; (d) the maximum temperature recorded was usually between the 12th and 14th hour.—P. S. WATTS.

I. SABIN, Florence R. (1938). **Cellular Reactions to Tuberculo-Proteins Compared with the Reactions to Tuberculo-Lipids.**—*J. exp. Med.* **68**. 887-852. 12 figs. on 2 plates, 3 tables. [Numerous refs.]

II. SABIN, Florence R., & JOYNER, A. L. (1938). **Cellular Reactions to Defatted Tubercle Bacilli and their Products.**—*Ibid.* 853-868. 6 figs. on 2 plates, 3 tables, 1 chart. [Numerous refs.]

I. Normal and tuberculous rabbits and g. pigs were inoculated with the three fractions of tuberculo-protein, the soluble precipitate, freshly prepared precipitate and the more insoluble protein. In normal animals proteins in solution induced new formation of monocytes. Freshly prepared precipitate activated the monocytes and epithelioid cells formed small tubercles. There was a complex cellular reaction to the insoluble protein, monocytes and macrophages were stimulated, both the epithelioid type and the foreign body type of giant cell were formed, and epithelioid cells were either in tubercles or scattered diffusely.

Introduction of the three tuberculo-protein fractions into tuberculous animals provoked greatly enhanced cellular reactions compared with those in normal animals. Tuberculo-lipids caused relatively simple reactions involving mainly epithelioid cells. The histological changes as illustrated by the plates are fully explained.

II. The chemical procedures used to obtain the materials from the tubercle bacilli are outlined in the chart and the writers discuss these methods of producing fractions of tubercle bacilli. The cellular reactions in experimental animals to defatted tubercle bacilli and the residue after treatment with 25% alcohol were similar to those reactions produced by heat-killed organisms. Abscesses were formed, and tubercles of monocytes and epithelioid cells ; giant cells contained masses of bacilli and neutrophiles infiltrated the tubercles. The defatted bacilli lack lipids removable by alcohol, ether and chloroform but contain the firmly bound lipid which can be resolved into hydroxy acid and polysaccharide. The hydroxy acid gives rise to foreign body giant cells and the tissues become invaded with eosinophiles. The polysaccharides call neutrophiles from the blood stream. The reactions to the unfiltrable lipid include those of both its constituents.—J. REID.

BEERENS, J. (1939). Apparition de lésions intestinales chez le cobaye par inoculation de tuberculine dans les ganglions mésentériques. [Intestinal Lesions in G. Pigs after Injection of Tuberculin into the Mesenteric Lymph Nodes].—*C. R. Soc. Biol. Paris*. **130**. 126-128.

Fifteen healthy and 15 tuberculous g. pigs each received 0.05 c.c. of tuberculin, undiluted or diluted to 1:10, into an ileo-caecal lymph node. P.M. examination 2-20 days after inoculation revealed no lesions in the healthy g. pigs, while 14 of the tuberculous g. pigs showed several necrotic ulcers (2-4 mm. in diameter) involving part or whole of the thickness of the caecal wall. Histologically these ulcers consisted of areas of fibrinous necrosis surrounded by young granula-

tion tissue. Injection of tuberculin into the intestinal wall caused necrosis only at the site of injection.—R. O. MUIR.

CALMETTE, A. (1934). La sensibilité tuberculinique (ou allergie). Ses rapports avec l'infection tuberculeuse et avec l'état d'immunité conféré par le vaccin B. C. G. [**Tuberculous Allergy and its Connexion with Immunization by BCG**].—*Mém. Prof. Jean Cantacuzène*. pp. 103-109. [3 refs.] Paris: Masson et Cie.

C. discussed the meaning of the terms allergy and anaphylaxis and gave his own definitions, especially in regard to bacterial infections. He did not agree with the view that individuals immune to tuberculosis are also necessarily allergic, and that there is no immunity without allergy. Cattle injected with weak doses of virulent tubercle bacilli do not show allergy for some weeks. Until that state is developed they react in this respect to virulent superinfections as if they were immune.

The so-called anergizing factors, as for instance ultra-violet radiations, inhibit allergy but do not influence immunity. The allergic state can also be removed by accustoming the body to progressive doses of tuberculin, although resistance to superinfections is not impaired.

Allergy is an indication of the existence of an infection, but not of immunity. Tuberculous allergy only appears when the symbiosis of the bacilli with the macrophages has formed the "elementary tubercle" or "tuberculoocyte", and, in BCG vaccination, when the organisms have become established in the body; it disappears when BCG ceases to survive.

A state of allergy does not give any indication of the benignity, gravity, localization, age or actual state of the infection.

BELLER, K. (1939). Allergie und allergische Krankheiten. [**Allergy and Allergic Diseases**].—*Tierärztl. Rdsch.* 45. 63-68. 5 figs.

The text of a lecture delivered at a post-graduate veterinary course. B. gives a comprehensive account of the growth of knowledge on antibodies, natural and acquired immunity, and allergy, giving examples of how these operate in animal disease.—J. E.

PRIESTLEY, F. W. (1938). Some Observations on the Phagocytosis of *Br. Abortus* by Polymorphonuclear Leucocytes.—*Vet. Rec.* 50. 1793-1797. 1 fig., 8 tables. [13 refs.]

P. retested Huddleson's technique [*V. B.* 8. 233.] and found that the density of the suspension was of primary importance. No differentiation into positive or negative could readily be made unless suspensions of a density of Brown tube 15 were employed. It is shown that the phagocytosis test is a more delicate indication of the presence of antibody than the agglutination test, and that the phagocytosis is due to a specific antibody present in the plasma. Non-virulent *Br.a.* organisms were not more readily phagocytised than virulent organisms.—P. S. WATTS.

MIR-DAMADI, M. (1937). La brucellose. Le séro-diagnostic rapide. [**Rapid Serological Diagnosis of Brucellosis**].—*Thesis, Alfort*. pp. 90. [Num. refs.]

A description of brucellosis in animals and man. Some personal observations in comparing the rapid and tube methods of agglutination and the complement-fixation test showed agreement in 97 % of the tests performed. The sero-flocculation test gave variable results. There is no new information.—S. J. GILBERT.

NÉLIS, P. (1938). Les corps gras et la production des agglutinines anti-Bang. [**Fats and the Formation of Anti-Brucella Agglutinins**].—*C. R. Soc. Biol. Paris*. **128**. 597-599. [4 refs.]

Twelve rabbits were divided into three groups, and all of them received subcutaneous injections of 2 c.c. of a mixture containing *Br.a.* organisms. The mixture given to the first group was made up from 1 c.c. of a heat-killed suspension of *Br.a.* and 8 c.c. of normal saline; that given to the rabbits in the second group was from 1 c.c. of a live suspension of *Br.a.* incubated with 8 c.c. of a vaseline-lanoline mixture at 37°C. for 24 hours, and the third group of rabbits received injections from a mixture composed of 1 c.c. of a live suspension of *Br.a.* incubated with 8 c.c. of cod liver oil at 37°C. for 12 hours. The data in a table giving the agglutinating titres of the sera of the three groups after 60 days indicate the agglutinogenic value of the bacilli killed by cod liver oil or vaseline-lanoline, compared with heat-killed bacilli.—R. O. MUIR.

WINTER, A. R. (1939). **Whole Blood Pullorum Studies**.—*Poult. Sci.* **18**. 26-30. 1 table. [6 refs.]

W. summarizes the results of agglutination tests on about 6,000 birds by various techniques. There was about 99% agreement between the tube test (serum 1:50 dilution) and the whole blood plate test, if the flock infection was low. When the infection was high in a small group of birds, there was only 87% agreement, the tube test appearing more reliable for bloods of low aggl. titre. Substitution of serum for whole blood in the plate test proved less efficient, but raising the temperature for conducting the test to 90°F. as compared with 40°F. did not affect results, but merely shortened the time of agglutination. Some form of agitation of the plate was found essential for the efficiency of the plate test.

Comparison between two proprietary stained antigens was made, one of these proving more serviceable when reading the whole blood test in poor light. The influence of certain diets on the reading of this test was also investigated, but no results are given.—C. V. WATKINS.

TRUCHE, C. (1934). Les différents diagnostics de la pullorose. [**Diagnosis of Bacillary White Diarrhoea**].—*Mém. Prof. Jean Cantacuzène*. pp. 739-754. [Numerous refs.] Paris: Masson et Cie.

The aetiology of B. W. D. and methods that have been tried for its diagnosis are reviewed, for example by using pullorin [*V. B.* **2**. 923]. T. describes a method of serum agglutination using living cultures in Martin's broth medium diluted with physiological saline. The birds are bled after fasting for 24 hours.

CHAPMAN, G. H., & LIEB, C. W. (1937). **The Use of Leuco Triphenylmethanes as Reagents for Bacterial Polysaccharides. (Preliminary Report)**.—*Stain Tech.* **12**. 15-19. 1 table. [2 refs.]

It was observed that when an acidulated solution of leuco methyl violet was added to suspensions of staphylococci, deep blue or violet colours were produced. Further investigations showed that the active ingredient of the bacterial suspension was a bacterial polysaccharide, and that in addition to leuco methyl violet (hexamethyl triaminotriphenyl methane), leuco malachite green (tetramethyl diaminotriphenyl methane) and derived reagents gave a similar reaction. The authors suggest that these triphenylmethanes might be considered to meet the need of a reagent for detecting and estimating bacterial polysaccharides without having to hydrolyse them before testing.

CAMERON, G. D. W. (1938). **Seasonal Variation in Response of Guinea Pigs to Toxoid.**—*Canad. publ. Hlth J.* 29. 500-503. 4 tables. [6 refs.]

Confirmatory evidence is presented that the immunity response in g. pigs to diphtheria toxoid, as measured by the Schick test, shows a seasonal fluctuation. This response in summer is fairly high but uniform, while the winter-spring percentages differ widely. This variation might suggest that diet is an important factor, as during the summer an adequate supply of green feed is available.

—D. G. MCKERCHER.

KHOI, N. D. (1939). Recherches sur la valeur antigénique des différentes fractions chimiques du bacille tuberculeux vis-à-vis du sérum sanguin et du liquide pleural des tuberculeux. [**Antigenic Value in Complement-Fixation Tests of Different Chemical Fractions of Tubercle Bacilli against Infected Blood Serum and Pleural Fluid**].—*C. R. Soc. Biol. Paris.* 130. 215-217. 2 tables. [8 refs.]

Complement-fixation tests were carried out with six different antigens, prepared from the lipid, lipo-protein and polysaccharide-protein fractions of the tubercle bacillus, against the blood serum of 25 tuberculous patients and the pleural fluid from seven cases of tuberculous pleurisy, using Besredka's technique. Antibodies for the lipoids, appeared to predominate in both blood serum and pleural fluid. In 20% of the sera and 50% of the pleural fluids, in addition to the antibodies for lipoids, antibodies were demonstrated which reacted with the polysaccharide-protein antigen.—R. O. MUIR.

SCHAEFER, W., & SANDOR, G. (1939). Mise en évidence d'un anticorps protéidique vrai dans le sérum d'un cheval préparé avec des bacilles bovins dysgoniques lisses. Sa séparation des anticorps lipoïdiques et polyosidiques. [**Demonstration of a True Protein Antibody in Horse Serum Prepared with Smooth Dysgonic Bovine Tubercle Bacilli. Separation from the Lipoid Antibodies and Polyosidic Antibodies**].—*C. R. Soc. Biol. Paris.* 130. 155-159. [6 refs.]

Complement-fixation tests were performed against various tubercular antigens with horse serum prepared by intravenous injections of heat-killed smooth dysgonic bovine tubercle bacilli. The antigens employed were the following:—phosphotungstic tuberculin (from a Vallée bovine strain and consisting purely of proteins and proteoses); proteins precipitated by saturation of human or bovine cultures with ammonium sulphate and containing 25% of reducing substances; purified proteins reprecipitated by trichloroacetic acid and free from reducing substances; polysaccharides precipitated by 50-80% methyl alcohol from the residue after protein extraction, and lipoids extracted by alcohol from tubercle bacilli. By specific inhibition of the different antibodies, this antibacterial serum was shown to contain entirely distinct antibodies for proteins, polysaccharides and lipoids.

—R. O. MUIR.

GORECZKY, L., & VON LUDANY, G. (1938). Ueber die bakterizide Fähigkeit des Milzdepotserums. [**The Bactericidal Power of Spleen Depot Sera**].—*Z. Immunforsch.* 94. 45-48. 1 table. [9 refs.]

Working with dogs, the authors showed that blood serum collected from the spleen is about 30% more effective in immobilizing *Salmonella typhi*, *Vibrio cholerae*, staphylococci and *Bacillus anthracis* than is serum from the peripheral circulation. They speak of the serum from spleen blood as "depot serum" and emphasize its protective action; they argue that the well-recognized ability of the spleen to filter bacteria from the circulating blood and to retain them is due largely to the immobilizing action of this depot serum.—E. J. PULLINGER.

## DISEASES, GENERAL

WYSSMANN, E. (1938). Der Meteorotropismus des bösartigen Katarrhalfiebers. [The Influence of Season and Weather on Bovine Malignant Catarrh].—*Schweiz. Arch. Tierheilk.* 80. 517-524. 2 tables, 4 graphs.

Statistical stock insurance reports for the years 1932, 1933 and 1937, concerning 400 fatal cases of bovine malignant catarrh, revealed a maximum incidence during spring and summer (66%), with a marked falling-off in August. Occasionally numerous cases occur after a drop in temperature and an increased humidity. The observations are incomplete, as only fatal cases are reported. W. believes the malady to be a typical infectious disease closely related to certain climatic conditions, lowering of the bodily resistance being the actual inciting cause. He puts forward three hypotheses dealing with alkalosis, the operation of undefined electric phenomena, and changes that may develop in the autonomic nervous system.

—V. CHLÁDEK (PRAGUE).

I. RIMINGTON, C., ROETS, C. G. S., & FOURIE, P. J. J. (1938). Quantitative Studies upon Porphyrin Excretion in Bovine Congenital Porphyrinuria (Pink Tooth) No. 1.—*Onderstepoort J. vet. Sci.* 10. 421-429. 2 figs., 1 appendix. [20 refs.]

II. FOURIE, P. J. J., & RIMINGTON, C. R. (1938). A Further Case of Congenital Porphyrinuria (Pink Tooth) in a Living Grade Friesland Cow in South Africa. (Cedara Case).—*Ibid.* 481-486. 4 figs. [2 refs.]

I. Quantitative porphyrin determinations were made of faecal and urinary porphyrin from two bovines with congenital porphyrinuria for periods varying from 3 to 6 days at different times of the year. The authors found that :—(1) the porphyrin excretion from an animal varies from day to day ; (2) there appears to be no correlation between excreted uroporphyrin, urinary coproporphyrin and urine volume ; uroporphyrin and coproporphyrin seem to run a parallel course in the urine ; (3) there seems to be a relationship between faecal coproporphyrin and faecal weight ; (4) the highest porphyrin excretion recorded from one animal during 24 hours was 1.27 g., and (6) in the urine of one animal the ratio of coproporphyrin I to coproporphyrin III was 27.6:1. Uroporphyrin I and III and coproporphyrin I and III were identified.

II. This so-called Cedara case is described as a further case of congenital bovine porphyrinuria (pink tooth) in a Friesland cow which produced a healthy, clinically normal calf ; this is the first affected cow known to have produced a calf.

MOON, V. H. (1937). Shock, Its Mechanism and Pathology.—*Arch. Path.* 24. 642-668 and 794-813. 1 fig. [Numerous refs.]

This is a review of the historical and current theories of shock arising as a result of trauma or surgical interference. Several of the proposed explanations have lacked confirmation by subsequent investigation. The results of experiments and observations made in testing theories leads M. to define shock as "a circulatory deficiency, not cardiac and not vasomotor in origin, characterized by decreased total blood volume, decreased volume flow and by haemoconcentration". It would appear that the circulatory deficiency results from stasis, leakage and dilatation in the capillaries caused by the effects on their walls of substances absorbed from the injured tissues. The evidence does not support the idea that local loss of blood at the site of injury is an adequate explanation for shock, although such loss contributes to the circulatory deficiency.—N. J. SCORGIE.

BOERNER, F. (1938). **Changes in the Blood Cellular Elements in Relation to Diagnosis and Prognosis.**—*J. Amer. vet. med. Ass.* **93**. 303-306.

A general discussion on the use of haematological methods in diagnosis and prognosis. The article contains nothing that is new.—D. L. HUGHES.

OPPERMANN, T. (1938). Die Haematologie im Dienste der Bekämpfung der Aufzuchtkrankheiten. [**Haematology in the Control of Breeding Diseases**].—*Dtsch. tierärztl. Wschr.* **46**. 774-776. 4 figs., 1 table.

Breeding diseases associated with over or under feeding are discussed. Cases of hyperprotinaemia in three-year-old horses are described in detail. The main finding was a low blood albumin-globulin ratio.

With regard to breeding diseases of the cow, cases of sterility have been investigated in which weak or irregular periods of oestrus occur without any detectable change in the genital tract. Pathological change in the blood was demonstrated by the "guttadiaphot" technique [*V. B.* **4**. 398.], a distinct "halo" being produced. The albumin ratio was also changed. These changes in the blood have been produced experimentally by intensive feeding with soya bean meal. In 63 cases of trichomonas infection, 29 showed a low haemoglobin content of the blood and an increased phosphorus content.

Forms of sterility and abortion in the sheep due to under-nourishment are described; both are characterized by alteration in the albumin:globulin ratio.

—A. T. PHILLIPSON.

DAM, H., & GLAVIND, J. (1938). **Alimentary Exudative Diathesis.** [**Correspondence**].—*Nature, Lond.* **142**. 1077-1078.

A preliminary note on the occurrence of an accumulation of fluid in the subcutaneous connective tissue of chicks fed on an experimental diet in which the protein had been extracted by alcohol. There also occurred hyperaemia and leucocytosis, chiefly in the subcutaneous fat tissue. It is suggested that this exudative diathesis is a deficiency disease and attempts are being made to find the protective factor, which probably occurs in dried alfalfa.—N. J. SCORGIE.

GUENTHER, D. F. (1938). Vergleichende Studie zur kausalen und formalen Genese der Gallensteine bei Mensch und Tier. [**Genesis of Gall Stones in Man and Animals**].—*Tierärztl. Mitt.* **19**. 896-898. [Numerous refs.]

G. states that present day knowledge about the formation of gall stones is derived entirely from human medicine. In man three types are recognized, (a) calcareous pigmented stones containing cholesterol, (b) pure cholesterol stones, which always occur singly, and (c) calcareous stones pigmented with bilirubin. Infection of the gall bladder and obstruction to the flow of bile are considered to be the two main factors concerned in their production. With infection the desquamated epithelial cells etc. form the nucleus of the stones. The aetiology of stasis alone is not understood; it is, however, often associated with infection.

In animals gall stones are most frequently associated with distomatosis in cattle and sheep; numerous small stones are found composed of end products of inflammation with carbonates and phosphates of calcium and magnesium. Inspissated deposits with a high specific gravity sometimes occur in pigs.

—A. T. PHILLIPSON.

SHANKS, P. L. (1938). **An Unusual Condition Affecting the Digestive Organs of the Pig.**—*Vet. Rec.* **50**. 856-858.

A description of an undiagnosed disease of pigs 10-14 weeks old seen on 20

farms in Northern Ireland. In all cases there was a history of sudden change of diet from poor to rich and resultant sudden death. A few pigs seen before death showed excitement, incoordination of the limbs and acute conjunctivitis with oedema of the eyelids. The eye changes were a notable P.M. feature and there was also oedematous thickening of the stomach wall or oedema of the mesentery. The gastric oedema was confined to the space between the mucous and muscular coats and in a few cases the lesions extended to the small intestine.

The disease could be prevented by stopping the rich food and giving a saline purge and bran mash.—J. E.

HINDMARSH, W. L. (1987). **Trembling in Young Pigs.**—*Aust. vet. J.* **13**. 249-251. [6 refs.]

Several cases are recorded in which violent tremors of the head, trunk and limbs were noted in new-born pigs when disturbed. Among those that recovered the symptoms usually disappeared in fourteen days. The condition appears to be similar to that reported by other observers [*V. B.* **7**. 546.], but evidence of an hereditary factor in the present cases was not strong.—H. B. CARTER.

KERNKAMP, H. C. H., & BOYD, W. L. (1988). **Erythema Multiforme: A Disease of the Skin in Swine.**—*J. Amer. vet. med. Ass.* **93**. 892-893. 1 fig. [2 refs.]

Seven members of a litter of swine were affected with a skin condition, the macroscopical and histological appearance of which is described. The cause was not established but there was a history of dipping in a coal tar dip seven days previous to the onset of the condition, at which time the skin of all the pigs was normal.—L. E. HUGHES.

WITZIGMANN, J. (1989). **Das Ekzem im Lichte neuer Forschung. [Eczema in the Light of Recent Research].**—*Dtsch. tierärztl. Wschr.* **47**. 1-8.

Speculation concerning aetiology. Such factors as warm weather, intestinal intoxication, allergy, acidosis, avitaminosis, hormonal dysfunction and hypothyroidism are discussed. Special attention is given to the operation of vitamin H, on account of its relation to fat metabolism, keratinization of the skin and seborrhoea.

—V. CHLÁDEK (PRAGUE).

WILLIAMS, J. G., STEYN, D. G., & GROENEWALD, J. W. (1988). **An Investigation into the Nature and Cause of a Disease in New-Born Merino Lambs Affecting the Thyroids and Nervous Systems.**—*J. S. Afr. vet. med. Ass.* **9**. 182-187. [1 ref.]

A disease of new-born lambs is described in which the most prominent symptoms were enlargement of the thyroids and peculiar forms of ataxia. In some cases almost all the lambs were affected. The thyroids were enlarged in nearly all cases, being 10 times their normal size. The mortality was almost 100% and death occurred sometimes within a few hours of birth, sometimes a few days later. The disease was apparently caused by a deficiency in the ewes, which had grazed on very poor, dry, mature grass pastures. There seemed to be a prolonged deficiency of several food substances such as vitamin A, phosphorus and iodine. As preventive measures the authors suggested avoidance of overstocking and giving the ewes green food for one or two months before lambing.—E. M. ROBINSON.

HINDMARSH, W. L. (1987). **Congenital Deformity in Calves.**—*Vet. Res. Rep., Dep. Agric. N.S.W.* **1937**. pp. 58-68. 1 table.

The condition described occurs only among cattle pastured in swamp areas

in the Maitland (N.S.W.) district; it is of frequent occurrence among such cattle. The incidence of the birth of deformed calves appeared to bear some relation to the depth and permanence of the swamps and the amount of time spent by cattle in the swamp. The swamp herbage comprises *Triglochin procera*, *Paspalum distichum* and *Jussieuia repens*. Feeding trials with these plants on g. pigs suggested that *Jussieuia repens* might be responsible for the condition.—H. McL. GORDON.

HEWETSON, H. R. (1936). **Hysteria in Dogs**.—*Vet. Rec.* **48**. 1202-1210. Discussion pp. 1210-1218. 1 table. [Numerous refs.]

In the light of his own clinical experience, H. reviews the various theories advanced with regard to the aetiology of canine hysteria. He does not arrive at any definite conclusion but tends to suggest that a number of factors—diet, environment, etc.—may act simultaneously. Blood samples taken from dogs suffering from hysteria were submitted to chemical analysis for Ca, Mg, and blood sugar; they gave values which fell within the normal ranges. The author discusses prophylaxis, prognosis and treatment. A number of speakers took part in the subsequent discussion on this paper, the general consensus of opinion appearing to be that hysteria had a dietetic origin.—N. J. SCORGIE.

VERSTRAETE, A., & THOONEN, J. (1938). Hypophysaire cachexie bij den hond. [**Pituitary Cachexia in a Dog**].—*Vlaam. Diergeneesk. Tijdschr.* **7**. 186-196. 5 figs. on 2 plates. [6 refs.] [English, French and German summaries].

A case of pituitary cachexia in a dog is described, corresponding clinically to Simmonds' disease in man, with extreme emaciation, pyrexia, atrophy of the genital organs and alopecia.

Histological examination revealed general atrophy of the thyroid and adrenal glands and genital organs.—JAC. JANSEN (UTRECHT).

I. FREDERIKSEN, O., & ENGBRETH-HOLM, J. (1938). **The Reactivation of the Fowl-Leukosis Agent after Inactivation by Oxidization**.—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 49-51. [In English].

II. LEE, C. D., & WILCKE, H. L. (1939). **The Migration of the Etiologic Agent of Fowl Leukosis when Subjected to Electrophoresis**.—*J. Amer. vet. med. Ass.* **94**. 178-186. 6 tables. [9 refs.]

I. This is a summary of material presented at the Scandinavian Pathological Congress in 1938. The authors state that infective plasma can be rendered inactive by subjecting it to oxidation and can be reactivated by subjecting it to reduction. They state that their findings may be of importance in relation to the question as to whether tumour viruses are to be considered as living micro-organisms or as chemical substances.

II. Material prepared from tumour-bearing organs of an affected bird was subjected to electrophoresis at pH values ranging from 4.01 to 9.01, and injected into healthy birds in a series of six experiments. The work shows that at pH values 4.01 to 6.01 the aetiological agent migrates to the negative pole, while at pH values of 7.01 to 9.01 it migrates to the positive pole; beyond the limits of pH 4.01 and 9.01 it is inactivated.—W. J. IRONSIDE.

JANSEN, J. (1938). Over het voorkomen van leucosis, tumoren, en darmparasieten op een kippenbedrijf vrij van Neurolymphomatosis gallinarum. [**Leucosis, Tumours, and Intestinal Parasites in Fowls Free from Fowl Paralysis**].—*Tijdschr. Diergeneesk.* **65**. 892-894. [English, French and German summaries].

A poultry farm of 2,000-3,000 birds was kept under supervision for 3½ years,

during which time no symptoms of neurolymphomatosis gallinarum were seen. In 256 P.M. examinations no nerve changes were observed. On the other hand, the farm appeared to be strongly infested with all varieties of intestinal parasites, and leucosis and tumours were found in 8.2% of the birds.

BUTLER, W. J., WARREN, D. M., & HAMMERSLAND, H. L. (1988). **Nutrition as a Factor in the Incidence of Fowl Leukosis.**—*J. Amer. vet. med. Ass.* **93**. 807-815. 6 figs., 8 tables. [2 refs.]

During the course of their investigations the authors encountered fowl leucosis with enteritis, and suggest that there was some association between the feeding of certain commercial foodstuffs and the enteritis. They suggest that this association was related to the rancidity, which they were able to demonstrate in the marine oils which these foodstuffs contained; the rancidity of these oils interfered with the assimilation of vitamins present in the diet.

In a number of flocks of poultry under observation fresh cod-liver oil and wheat germ oil added to the diet improved egg production and lowered the mortality. The results obtained in certain selected flocks are described with tabulated figures for blood counts of individual birds. It is suggested that nephritis and gout may result from the use of excessive amounts of wheat germ oil and cod-liver oil. The authors believe that some of the infectious diseases can be prevented from becoming active in the animal body by corrective changes in the diet.—L. E. HUGHES.

DURANT, A. J., & McDUGGLE, H. C. (1988). **Leucemia (Erythro-Leucosis) of Canaries.**—*Vet. Med.* **83**. 888-889 and 420. 8 figs.

A condition is reported in canaries in which both liver and spleen were enlarged. The erythrocyte count was below normal. Attempts to transmit the disease to healthy birds failed.—L. E. HUGHES.

RUDDUCK, H. B., & WILLIS, R. A. (1988). **Malignant Tumours in Dogs.**—*Amer. J. Cancer.* **83**. 205-217. 20 figs. [7 refs.]

Nine cases of neoplasia in dogs are described, including two of epithelioma of the tonsil with metastases in the regional lymph nodes and lungs. The author states that carcinoma in the tonsils appears not to have been described. [Nevertheless, among dogs on which autopsies are made in London, this site is one of those most commonly affected with squamous cell carcinoma]. In both cases, the large size of the secondary tumour in contrast with the relatively inconspicuous primary tonsillar growth was a striking feature; in human cases, this has often been responsible for a wrong diagnosis. The remaining cases comprised:—primary adenocarcinoma of the cardiac portion of the stomach with metastases in the mediastinal lymph nodes, primary tumours of the pancreas with secondary tumours in the peritoneum and lymph nodes, and primary tumours of the prostate with wide-spread metastases; primary sweat gland carcinomata of the skin [sweat glands, contrary to prevalent teaching, being present in the skin of the dog]; carcinoma of the mammary gland in a bitch; mixed thyroid tumour with pulmonary metastases, and spindle cell sarcoma (possible rhabdomyosarcoma) of the heart, with metastases in the lungs and diaphragm.—E. G. WHITE.

CREW, F. A. E. (1988). **The Sex Ratio of the Domestic Fowl and its Bearing upon the Sex-Linked Lethal Theory of the Differential Mortality.**—*Proc. roy. Soc. Edinb.* **58**. 78-79. 8 tables. [18 refs.]

The sex-linked lethal theory, implying the lesser viability of the heterogametic sex, has always assumed that in birds and moths, where the female is the heterogametic sex, the female would therefore prove less viable. Since the literature on

the sex ratio of the fowl includes many conflicting statements, C. undertook an investigation on the sex ratio in 8,565 dead-in-shell chicks, determining the sex by down colour and dissection, 515,976 live-born chicks whose sex was determined by sex-linked colouring ("gold" cock + "silver" hen give white male chicks and buff female chicks) and a further 2,216,051 chicks sexed by the Japanese method (size and pigmentation of the cloacal papilla—98% accuracy is claimed for this method). Tables are given showing the results; there was a slight preponderance of males, so that these results offer no support for the sex-linked lethal theory.

C. points out that in his investigations he found that the sex ratio seemed to vary according to breed, and he asserts that this must account for the different results obtained by various workers using different breeds.

### NUTRITION IN RELATION TO DISEASE

GRUND, R. (1937). Beiträge zur Histologie der endokrinen Drüsen von leksucht-kranken Rindern. [**Histology of the Endocrine Glands in Bovines Affected with Pica**].—*Inaug. Diss., Hanover*. pp. 37. 1 table.

The endocrine glands of eight young cattle affected in varying degrees with pica were examined. The chief abnormality was found in the thymus glands in that they had either quite disappeared or only small vestiges were discovered in animals in which normally the glands would have been developed to their fullest. The microscopic structure of the remnants is described. The parenchyma had not been replaced by fat cells. The pituitary body in each case was subnormal in volume and weight; the structural alterations in this and in the other glands are discussed. An account is given of the apparent regeneration of the glands of one animal which after showing advanced signs of pica was given an adequate diet and was slaughtered when apparently in a normal healthy condition.

WILLIAMSON.

ROSSI, P. (1938). L'azotémie en médecine vétérinaire. [**Azotaemia in Veterinary Medicine**].—*Rev. vét. milit.* 22. 201-217. [Numerous refs.]

Azotaemia is defined as retention of the metabolic nitrogen waste-products in the body. It is characterized by an increase in the amount of blood urea, the normal levels for horses being given as 0.30-0.85 g. per litre of blood and for cattle as 0.80-0.40 g. These amounts are exceeded as a result of kidney impairment, e.g. nephritis, and also in certain bacterial and parasitic diseases. This article deals with the relation of parasitic diseases to azotaemia. R. found that the urea level of the blood was raised in equine piroplasmosis, mange, and infectious anaemia, but not in strangles, tetanus, or equine *Brucella abortus* infection. In Aujeszky's disease of cattle and in "influenza du boeuf" (stated to be due either to a *Pasteurella* or to a virus), the blood urea was markedly raised. There was also a transitory rise after surgical operations and after parturition. A simple method for the estimation of blood urea is described.—N. J. SCORGIE.

HENRY, Kathleen M., & KON, S. K. (1939). **Studies on the Metabolism of Calcium and Phosphorus and on the Availability of these Elements from Milk and from an Inorganic Source**.—*Biochem. J.* 33. 173-191. 15 tables. [Numerous refs.]

In a series of metabolism experiments with young male rats, the Ca of milk was found to be more available than that of  $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$ . In the presence of

extra P (as  $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ ) Ca was retained more efficiently from spray-dried milk than from  $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$  and under such conditions one-third the daily loss of Ca in the excreta of the rat is in the faeces and two-thirds in the urine. Retention of P is by no means as efficient as Ca even in the presence of extra Ca (as  $\text{CaCO}_3$  and 90% of the minimal loss of P occurs through the faeces. It is suggested that this relatively inefficient retention of P is due to the fixation of some of this element by intestinal bacteria, and that the faecal loss is mainly bacterial P. There is no evidence (at least in the rat) that the large intestine actively excretes either Ca or P, thus contradicting the usually accepted teaching.—ALFRED EDEN.

HINDMARSH, W. L., & BLUMER, C. C. (1937). **Studies in Nutrition of Sheep in the New England District of New South Wales. I. Nutritional Anaemia of Sheep. (Poorness of Blood of Sheep).**—*Vet. Res. Rep., Dep. Agric. N.S.W. 1937.* pp. 15-37. 8 tables. [3 refs.]

GRIFFITHS, E. L., & BENJAMIN, M. S. (1937). **Studies in Nutrition of Sheep in the New England District of New South Wales. II. Soil and Pasture Analyses of Affected Properties.**—*Ibid.* pp. 38-40. 3 tables

I. The symptoms shown by affected sheep included gradual loss of condition commencing from early autumn, lachrymation, pining, anaemia, weakness, and death. Sheep moved to other districts soon regained health and condition. Preliminary investigations suggested that the following factors were concerned in the causation of the losses:—the pastures were poor, rabbit infestation was heavy, the country was overstocked, worm infestation was common, and the winter climate was severe. A field trial demonstrated that neither the administration of iron in lick form nor anthelmintic treatment with copper sulphate led to alleviation of symptoms. A second trial established the following facts:—

(1) Di-calcic phosphate taken at the rate of 7.49 g. per sheep per week had little effect on the condition.

(2) Meat meal (protein 60.4%, tricalcic phosphate 9.5%, moisture 4.8%) was not eaten in sufficient amounts to be of value in maintaining the condition of sheep. This was considered to be partly due to the fact that it was incorporated in a mixture of dicalcic phosphate and salt, that meat meal is not palatable to sheep, and that under conditions that exist in the tableland areas, meat meal, although in covered troughs, absorbs much moisture and tends to undergo decomposition in wet seasons.

(3) Drenching sheep at monthly, and later, fortnightly intervals with copper sulphate solution had little effect in reducing the incidence of anaemia.

(4) The provision of a more nutritive diet in the form of cultivated and sown pasture, or of oats and lucerne hay, enabled sheep to recover from anaemia and gain in body weight.

II. Four soil and two pasture analyses were carried out. The soils examined were light sand loams of granitic origin. They were strongly acidic and contained low percentages of "citrate soluble" phosphoric acid (0.0005-0.0017%) and lime (0.049-0.09%). Soils were also deficient in nitrogen and organic matter. Pasture samples showed low percentages of phosphoric acid (0.194-0.261% of dry matter) and crude protein (5.77-7.18%). There was a suggestion that other elements, e.g. iron, might be deficient in the pasture.—H. McL. GORDON.

GENDREAU, L. A. (1938). **Anaemia in Suckling Pigs.**—*Canad. J. comp. Med.* 2. 105-107.

A reference to the value of sunlight, sods and green food for the prevention of the disease; the feeding of iron to sows in the absence of these conditions is

ineffectual, and to save affected sucklings, it is necessary to administer iron (ferrum redactum) in 15 grain doses every other day from birth until the animals can eat.

—L. M. HEATH.

- I. HUTCHINSON, J. H. (1938). **The Role of Copper in Iron Deficiency Anaemia in Infancy.**—*Quart. J. Med.* 7. 397-419. 9 tables, 9 charts. [Num. refs.]
- II. ANON. (1939). **Trace Elements in Anaemia.**—*Brit. med. J.* March 11th. 518-515. [4 refs.]

I. After fully reviewing the available literature on the role of Cu in the Fe-deficiency anaemias, H. describes the results obtained with nine infants suffering from a nutritional anaemia, following both Fe and Cu therapy. Metabolism studies were conducted at the same time and it was found that administration of Cu following Fe therapy increases the conversion of Fe stored in the tissues into haemoglobin as reflected by R.B.C. counts and Hb determinations. Further, it was shown that Fe given in small doses so as not to raise materially the Hb content of the blood can be subsequently mobilized by giving Cu and be converted into Hb. It is suggested that the action of Cu is catalytic, enabling the Fe stored in the tissues to be converted into such a form that it is transported by the blood plasma to the bone marrow, where it can be utilized for Hb formation.

II. This article deals principally with the relationship of Cu to anaemia although the Australasian work on Co in anaemias of sheep is briefly reviewed. The importance of Cu is further emphasized by:—(a) Japanese work in which the effect of additional Cu in blood transfusion in women after childbirth or in chronic anaemia was found greatly to accelerate the regeneration of R.B.C. and Hb, and (b) the work of HUTCHINSON [see abstract above] who found that in infants fed exclusively on a milk diet, when Hb regeneration ceased or declined after the cessation of Fe therapy, it could be regained by the administration of Cu alone (as had been previously shown with rats). The catalytic action of Cu appears to enable Fe from the storage depots of the body to be converted into a transportable form and to be utilized by the bone-marrow for Hb formation.—ALFRED EDEN.

- I. VEDDER, E. B., & CHINN, A. B. (1938). **Beriberi or Inanition? I. The Effect of Starvation, with and without Vitamin B<sub>1</sub>.**—*Amer. J. trop. med.* 18. 469-475. 8 figs., 2 tables. [4 refs.]
- II. VEDDER, E. B. (1938). **Beriberi or Inanition? II. The Administration of Vitamin B<sub>1</sub> to Rats Receiving Unbalanced Diets.**—*Ibid.* 477-481. 1 table. [5 refs.]

I. Three groups each of six rats were subjected to the following treatments respectively:—(1) complete starvation, (2) starvation plus a daily dose of 3,000  $\gamma$  of vitamin B<sub>1</sub> in crystalline form, and (3) an ordinary diet deficient in vitamin B<sub>1</sub>. Examination of the sciatic and brachial nerves treated by the Marchi method showed no difference between the degree of degeneration present in the animals of all three groups. The fact that even such a large dose of vitamin B<sub>1</sub> did not prevent degeneration of the nerves in group (2) is taken to indicate that the rat cannot use vitamin B<sub>1</sub> directly in the absence of food. The decrease in weight of the hearts of animals deprived of vitamin B<sub>1</sub> was proportionally greater than the loss of body-weight.

II. P.M. examinations of three groups of rats fed on protein, fat and carbohydrate diets respectively plus 200 $\gamma$  of crystalline vitamin B<sub>1</sub> per rat daily, revealed no degeneration of the peripheral nerves in the protein and fat groups, but the rats fed on carbohydrate did develop a slight degeneration of the nerves in spite of the vitamin B<sub>1</sub> supplement. Since the group on a fat diet lost an average of 28% of

their original body-weight and all subcutaneous and body fat, it was considered that they definitely suffered from inanition, yet no nerve degeneration occurred. Therefore it is considered that the degeneration of the nerves found in polyneuritis cannot be ascribed to inanition. V. considers that these facts throw a grave doubt on the theory that the nerve degeneration of polyneuritis is due to pyruvic acid.

—R. ALLCROFT.

BIRD, H. R., OLESON, J. J., ELVEHJEM, C. A., & HART, E. B. (1938). **Effectiveness of Chondroitin in Preventing Gizzard Erosion in Chicks.**—*J. biol. Chem.* 126. 671-678. 2 tables. [17 refs.]

Chondroitin preparations fed to chicks until they were four weeks old were effective in preventing gizzard erosion. The chondrosamine portion of the chondroitin molecule was not effective, but evidence that glucuronic acid is the active portion is presented and discussed.—R. ALLCROFT.

WALLIS, G. C. (1938). **Some Effects of a Vitamin D Deficiency on Mature Dairy Cows.**—*J. Dairy Sci.* 21. 315-333. 4 figs., 1 table, 3 charts. [18 refs.]

The experiments reported in this paper verified that milking cows require vitamin D even though the Ca : P ratio of the diet be correct. Three cows in milk and one dry cow were kept on rations considered adequate except for the absence of vitamin D. Under these conditions the total Ca and P of the blood plasma showed a marked decline after three to four months, and shortly afterwards the cows showed signs of stiffness, which gradually increased in severity, the knees became bent forward, the spine rigid, and ultimately the animals were unable to rise without assistance. Administration of vitamin D immediately relieved these symptoms, and in the latter part of the lactations quickly changed a negative Ca and P balance to a positive one. One animal died and it was found that both femurs and the pelvis were fractured. Calves born after the cows had been on the deficient diets for some time had a rachitic appearance.—N. J. SCORGIE.

BRANION, H. D., TISDALL, F. F., & DRAKE, T. G. H. (1938). **Beryllium Rickets in Chickens.**—*Poult. Sci.* 18. 66-69. 4 plates, 1 table. [8 refs.]

Four groups of chicks were fed from hatching until 10 weeks of age upon normal rations, 3 groups receiving in addition 0.5%, 1.0% and 2.0% beryllium carbonate respectively. In the group receiving 1% there was a slight retardation of growth, more definite in the 2% group. By means of X-ray plates, plasma inorganic P and bone ash determinations it was found that at the 0.5%  $\text{BeCO}_3$  level there was no significant change in the plasma P level or on bone formation. Some rickets occurred in the 1%  $\text{BeCO}_3$  group, which was further characterized by a decided lowering of the plasma P and of the percentage of bone ash, with, however, marked individual variations. In the 2% group these changes were much more evident and rickets occurred in all chicks. From these results it is concluded that chicks are more resistant to Be rickets than rats, although there is a distinct individual variation.—ALFRED EDEN.

MARKUZE, Zofia. (1939). **Vitamins of Elephant's Milk.**—*Biochem. J.* 33. 198-200. 3 tables. [8 refs.]

The vitamin content of the milk of an elephant, in Warsaw, fed on grass, hay, wheat-bran, oil-cake, carrots and beets was compared with that of cows fed on a very similar diet. The quantity of vitamin A and D in the elephant's milk was much less than that in the cows (under 1 I.U. per ml.) but the vitamin  $\text{B}_2$  content was higher, being 25 I.U. per 100 ml. The elephant's and the cow's milk contained

practically the same amount of B<sub>2</sub> complex but the former had 7.72 mg. per 100 ml. of ascorbic acid compared with 2.12 mg. in the latter. The assays for the various vitamins were not made simultaneously nor throughout the whole period of lactation.—G. WILLIAMSON.

## PUBLIC HEALTH

DEFRIES, R. D. (1938). **Survey of Certain Milk-Borne Diseases in Canada.**—*Canad. publ. Hlth J.* 29. 255-261. 1 table. [18 refs.]

In this paper D. supplements the information compiled by MURRAY [V. B. 7. 490.] in 1936 with data obtained from the provincial departments of health and a number of municipalities. Evidence of the extent to which tuberculosis of bovine origin may be due to milk is furnished by the fact that 9.6% of the cases of extra-pulmonary tuberculosis in children under 14 years was due to the bovine type of bacilli; all these patients used raw milk. Typhoid and paratyphoid fevers have been the most frequently reported milk-borne diseases in Canada, and reference is made to certain outbreaks. Septic sore throat due to streptococci transmitted in milk has been encountered, and various cases of staphylococcal food poisoning have been traced to the milk supply. In recent years, many cases of undulant fever in Canada have also been shown to be caused by the consumption of infected milk.—J. L. BYRNE.

CLARKE, E. H. (1938). **The Producer and Safe Milk.**—*Canad. publ. Hlth J.* 29. 298-300.

Clarke discusses the responsibility which rests upon the producer supplying milk for fluid consumption. The need for healthy stock, proper sanitation in utensils and surroundings, and the provision of an even supply and regular daily delivery to urban centres are mentioned. A set of instructions to the dairy farmer to enable him to reduce the number of bacteria is also given.—J. L. BYRNE.

WOOD, S. N. (1938). **Brucellosis of Dairy Cows [Danger to Man]. A Public Health Problem.**—*Canad. J. comp. Med.* 2. 241-252. 4 charts. [Num. refs.]

The article reviews the recent literature and gives in four instructive charts the possible sources of infection, the routes by which the bacillus gains entrance to the human organism, and the incidence of the disease in human beings. While raw milk is generally considered as one of the most important sources of infection, recent literature indicates the higher virulence of *Brucella suis* to man and the danger of the pig and its products as a reservoir of infection. The importance of direct contact with infected farm animals and the handling of raw meat from such animals in the transmission of the disease is pointed out. Ways and means are then discussed by which the supply of wholesome milk may be assured.—H. KONST.

I. ELLINGER, C. (1938). **Controlling Contamination of Raw Milk.**—*Canad. publ. Hlth J.* 29. 277-282. 4 tables. [4 refs.]

II. BERRY, A. E. (1938). **Milk Control Legislation in Canada.**—*Ibid.* 301-304.

III. BERRY, A. E. (1938). **A Survey of Milk Control in Cities and Towns in Canada.**—*Ibid.* 305-309. 1 table.

I. E. reviews the efforts made over a period of seventeen years to improve the raw milk supply to the city of Edmonton. It is felt that the methylene blue reduction test permits the attainment of higher standards than does the plate count; because it measures utensil contamination more effectively, and that adoption

of the principles of the Standard Milk Ordinance (United States Public Health Service) is probably the best way to obtain desirable results quickly. The outcome of these efforts has been a marked improvement in the class of milk submitted for consumption.

II. Legislation for the control of fluid milk supplies is both a municipal and provincial responsibility. Local by-laws dealing with licensing and a variety of other details are passed in municipalities, under authority given by provincial statutes. A short synopsis is given of the regulations regarding milk supplies in the various provinces. B. points out that although provincial legislation varies considerably there is a movement to establish definite standards and more direct control over distributing plants. Ontario was the first province to adopt a compulsory pasteurization law. Dominion legislation has little to do with fluid milk, but through the Food and Drugs Act it controls milk products and their labelling, adulteration and composition.

III. In this paper, B. presents a complete table with data concerning the extent of pasteurization, volume of milk distributed and supervision of herds in municipalities having a population of more than 2,000. The information was obtained from the medical officers of health in the various centres. There is complete pasteurization of milk in two cities in Saskatchewan, in thirty-two in Ontario and in four in Quebec. Practically all centres have pasteurization in part, a few have no pasteurization and from some no information on this point was given. Other information regarding the occurrence of typhoid fever and other communicable diseases was also obtained.—J. L. BYRNE.

BURN, G. A. H. (1938). **Cleansing and Disinfecting Operations in a Small Dairy.**—*Canad. publ. Hlth J.* 29. 810-818.

The meaning of "cleansing" and "disinfection" is stressed. Plant and equipment design are referred to, also washing powders, disinfecting agents, cleansing and sterilizing equipment, bottle washing and disinfecting, and the washing and sterilizing of cans. A procedure for determining efficiency of washing and disinfecting operations is suggested, and provisions for cleanliness of personnel are outlined. Methods of following the regulations passed under authority of the Milk Control Act of Ontario are discussed.—C. MACKIE.

SMITH, M. Doreen. (1938). **The Use of the Phosphatase Test in the Control of Pasteurization.**—*Canad. publ. Hlth J.* 29. 288-294. [17 refs.]

This test is highly sensitive. The degree of accuracy and the adaptability of the test to various temperatures of pasteurization according to the graph of KAY and GRAHAM [*V. B.* 6. 542.], are discussed, as well as various later modifications.

Practical experiences with the test are reviewed, its use in the examination of other dairy products mentioned and finally possible sources of error and certain limitations are pointed out.—H. KONST.

GUITTONNEAU, G., MOCQUOT, G., & EYRAND, A. (1938). **Recherches sur la pasteurisation des laits de consommation. 1<sup>er</sup> mémoire: Choix d'un milieu de culture pour la numération des germes microbiens. [Pasteurization of Milk. 1. Choice of a Medium for Bacterial Counts].**—*Lait.* 18. 225-233. 5 tables. [4 refs.]

The considerations which lead to the choice of medium for direct plate-count of bacteria in raw and pasteurized milk are discussed. The authors chose a medium of which the base was skim milk, to which trypsin was added. The final product possesses all the nutritive elements of skim milk except casein, which is replaced

by products of trypsin-digestion. It is not stated how the casein was removed. Untreated skim milk proved too opaque for use, but the opacity was satisfactorily reduced by the addition of the trypsin. The suggested medium proved inexpensive and easy to procure and to prepare in laboratories situated near milk factories.

The authors compared the results of examination of raw and pasteurized milk on this medium and on the media of Bower and Hucker and of Demeter. No appreciable difference was noted in the results obtained from the use of each of the three media so compared.—H. BURROW.

Joss, E. C. (1939). **Construction and Equipment of Municipal Meat Plants.**—*J. Amer. vet. med. Ass.* **94**. 172-177.

The author states that 800 veterinarians are engaged on meat inspection and inspect about two-thirds of the animals used for human food in the U.S.A. The other third receives only limited veterinary inspection.

He recommends that the slaughterhouse should be situated where there is an ample and hygienic water supply, and adequate drainage for removal of the sewage from the slaughterhouse. The slaughterhouse should not be located in an area of factories and industries which give off dust and gases.

In a modern slaughterhouse concrete is preferable to wood. In the lairs and workrooms the window space should be equal to 25% of the floor space, and the water supply used for cleaning down workrooms should be under pressure and used through hose pipes. All the buildings should be adequately ventilated. There should be bleeding rails for cattle 16 feet above the floor and for sheep 11 feet above the floor. All openings should be screened to prevent the entrance of flies. Modern dressing rooms and lavatories should be provided for all the workers; drainage from the latter should not be connected to the drainage from the slaughterhouse.

Where metal equipment is required, joints should be eliminated as far as possible and the metal should be of rust-resistant material.

Mechanically-operated equipment is desirable for the cleaning of cattle viscera, and mechanical tripe-cleaning equipment of the sanitary type is also procurable. With these appliances the chance of soiling the organs and fats and other edible parts is reduced.

In this work the veterinarian has a community responsibility.

—BRENNAN DEVINE.

TOBEY, J. A. (1939). **Some Legal Aspects of Food Sanitation.**—*J. Amer. vet. med. Ass.* **94**. 153-156. [3 refs.]

Food sanitation is an important function of public health administration and it is the duty of the state to carry this out. Meat and dairy products are a common cause of food infections and this justifies adequate food control.

In the United States new federal laws have been introduced in the form of the new Food, Drug and Cosmetic Act. The provisions of this Act, from the food control point of view, are a great advance on preceding legislation; the Act prevents the false advertising of foods.

In addition to the federal laws there are the laws of the local authorities, particularly the municipalities, dealing with food control. These latter laws permit the local authorities to issue licences and permits in connexion with the manufacture of food. These laws should not, in themselves, remove the responsibility from the trade concerned, as it is the duty of the trade to deal with its products under hygienic conditions. Indeed, if the particular trade concerned carried out its responsibilities in a proper manner, there would be no need for the municipalities

to make byelaws in connection with meat control. In most centres the dairy industry and the meat industry have successfully modernized their plants with a view to producing food under hygienic conditions.—BRENNAN DEVINE.

## THERAPEUTICS

MERILLAT, L. A. (1938). **Chemotherapy.**—*Canad. J. comp. Med.* **2**. 63-71.

In accordance with the idea that physiologists and chemists by their researches are the path finders in clinical medicine, M. suggests the name "physio-chemistry" as a substitute for chemotherapy. He also points out that the study of the use of drugs and chemicals as remedies has been neglected owing to the efforts directed towards the production of biological specifics. In presenting his subject he makes brief mention of avitaminoses, ultraviruses, skeletal demineralization, therapy of digestive disorders and the use of iodine, sulphanilamide, pyferol (a tumour solvent) and glucose.—L. M. HEATH.

GREEY, P. H. (1938). **Experimental Studies with Sulphanilamide and Other Compounds.**—*Canad. med. Ass. J.* **39**. 12-15. [1 ref.]

The author briefly reviews the experiments leading up to the intensive investigations with sulphanilamide.

- I. HAMANN, E. E., & HUDDLESON, I. F. (1939). **Effect of Prontosil and Sulfanilamide on Brucella Abortus Infection in Two Cows.**—*J. Amer. vet. med. Ass.* **94**. 35-37. 2 tables. [8 refs.]
- II. CHINN, B. D. (1939). **The Use of Sulfanilamide in Experimental Brucellosis.**—*J. infect. Dis.* **64**. 78-82. 2 tables. [Numerous refs.]
- III. WILSON, G. S., & MAIER, Irene. (1939). **The Sulphanilamide Treatment of Guinea-Pigs Infected with Brucella abortus.**—*Brit. med. J.* Jan. 7th. 8-9. 2 tables. [8 refs.]

I. One of the animals was given prontosil in 5% solution subcutaneously and intramuscularly over a period of seven weeks and sulphanilamide twice daily *per os* for a week in the middle of the period of treatment. In the other, prontosil solution was injected into one of the quarters of the udder, six such injections being made over a period of five weeks. It was observed in both animals that a rise of temperature followed the administration of the drug, but in so far as the effects upon the agglutination titre and the excretion of brucella in the milk were concerned the results were inconclusive.

II. This deals with the effect of sulphanilamide on *Brucella melitensis*, *Br. abortus* and *Br. suis*. *In vitro* experiments showed that a concentration of 1:1,000 in dextrose broth destroyed *Br.a.* and *Br.s.* in ten minutes; a small number of *Br.m.* survived this exposure, but were destroyed within 24 hours. Lower concentrations were also used and were shown to have some bactericidal and bacteriostatic effect. *In vivo* experiments on g. pigs showed that the administration of the drug had a curative effect in a considerable number of cases and that this effect was better on *Br.a.* and *Br.s.* than on *Br.m.*

III. Two experiments were carried out in which groups of small numbers of infected g. pigs were treated with doses of various sizes and over various periods of time. Bacteriological examination of sublumbar lymph nodes and spleens revealed brucella infection in all groups except in those to which large doses had been given over a long period. In all groups however the number of organisms found present was smaller than in the controls. The authors tentatively conclude

that treatment favours the destruction of infection in g. pigs but that to attain bacteriological cure the drug must be given daily for some weeks in a dose bordering on the toxic limit.—W. J. IRONSIDE.

PLUMMER, P. J. G., MITCHELL, C. A., & WALKER, R. V. L. (1938). **Experiments with Sodium Sulfanilyl Sulfanilate.**—*Canad. J. comp. Med.* 2. 139-141. 2 tables, 1 graph. [1 ref.]

The authors were unable to confirm the work of DOCHEZ and SLANETZ [*V. B.* 8. 608.], who claimed that they were able to cure ferrets and dogs of dog distemper with sodium sulphanilyl sulphanilate. Nor did they find that the drug had any therapeutic action against the virus of equine encephalomyelitis (western type).

—L. M. HEATH.

HENRY, A., & GUILHON, J. (1939). Essais de traitement de la staphylococcie cutanée du chien par un dérivé sulphonamidé ;  $\alpha$  (p. amino-benzène sulfamido) pyridine. [**Treatment of Cutaneous Staphylococcus Infection in the Dog with M & B 693 and a Variant.**].—*Bull. Acad. vét. Fr.* 12. 92-95.

A record was made of the results obtained by the use of a member of the sulphonamide group, M & B 693, in three cases of staphylococcal skin infection in dogs. Dosage was *per os*, and in addition, a sodium variant of M & B 693 was given intravenously. The symptoms described corresponded to those of follicular mange. No toxic symptoms referable to the M & B 693 were recorded although dosage was considerable. The lesions healed and hair was replaced.—R. I.

GWATKIN, R., & MACLEOD, A. H. (1938). **Wheat Germ Oil in Brucella Infection in Cattle and Guinea-Pigs.**—*Canad. J. comp. Med.* 2. 133-136. [2 refs.]

Twenty-four cows from a reacting herd were divided into two groups, as equal as possible as regards serological reactions, previous abortions and ages. Each animal of one group received three subcutaneous inoculations in 38 c.c. of wheat germ oil, the other group being used as a control. The first inoculations were made a few days before or after breeding, and the other two, at three and at six months thereafter, respectively. Both groups intermingled freely. The results did not support the claims of MOUSSU [*V. B.* 6. 732].

Seven fortnightly inoculations of 1 c.c. subcutaneously of wheat germ oil into g. pigs had no effect on the course of the disease when these animals were experimentally infected *via* the eye.—L. M. HEATH.

FAURE, L. (1939). Traitement des teignes du cheval par la chaleur. [**Heat Treatment of Equine Ringworm.**].—*Ann. Parasit. hum. comp.* 17. 108-110. 1 fig. [1 ref.]

The author describes a method of treating ringworm in the horse by the application of a blunt-ended firing-iron heated to a dull red. He states that the skin and hair follicles are not injured as the iron is applied so lightly as to sear only the infected hairs and the superficial layer of the skin. Advantages claimed are, rapid cure of the affected animals, and ensured prevention of the spread of infection.

—R. ISHERWOOD.

SMITH, W. A. (1938). **Treatment of Sterility in Mares by Insufflation of the Fallopian Tubes.**—*Vet. Rec.* 50. 1192-1193. 1 fig.

S. describes a modification of human gynaecological technique for use in the mare. Four mares which had failed to breed for two or three seasons were treated and thereafter produced foals.—J. G. MURRAY.

PERVAKOV, A. J. (1987). K terapii diktiokauleza ovce. [**The Treatment of Dictyo-caulosis of Sheep**].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skrjabin*. pp. 467-468. Moscow: Lenin Acad. Agric. Sci.

P. made comparisons between a watery solution of iodine with and without glycerin; both solutions had similar anthelmintic properties.

- I. BISHOP, P. M. F., BOYCOTT, Muriel, & ZUCKERMAN, S. (1989). **The Oestrogenic Properties of " Stilboestrol " (Diethyl-Stilboestrol). A Clinical and Experimental Investigation.**—*Lancet*. 236. 5-11. 9 figs., 8 tables. [9 refs.]
- II. WINTERTON, W. R., & MACGREGOR, T. N. (1989). **Clinical Observations with Stilboestrol (Diethyl-Stilboestrol).**—*Brit. med. j.* Jan. 7th. 10-12. [5 refs.]
- III. LOESER, A. A. (1989). **Therapeutic Trials of Diethylstilboestrol.**—*Ibid*. 19. [5 refs.]

I. The authors have investigated carefully the oestrogenic properties of the synthetic hormone stilboestrol. It appears to imitate closely the natural oestrogens. Oral administration is as effective as administration by intramuscular injection.

II. The effective use of stilboestrol in the treatment of a number of cases of endocrine disturbance in the human subject is reported. The effects produced appear to be identical with those resulting from the administration of natural oestrogens. Administered prior to the appearance of milk in the mammary gland it effectively prevents the onset of lactation. If administered after lactation has begun, milk flow is diminished but not arrested.

III. From the clinical evidence presented it is clear that stilboestrol has marked oestrogenic effects and that it has a good " substitute action " in various forms of ovarian insufficiency.—R. N. C. AITKEN.

## POISONS AND POISONING

HADLEY, F. B. (1988). **The Sudan Grass Poisoning Problem.**—*Canad. j. comp. Med.* 2. 169-170.

This short paper is a summary of an investigation into the poisonous properties of Sudan grass (*Sorghum vulgare sudanese*), and of the cyanogenetic glucoside it may contain. The relative concentration in the grass varies with its colour and length and with the type of soil on which it is grown. It was further observed that cattle ceased to eat grass with a high cyanogenetic glucoside content after fifteen minutes. Practical application of the information given should materially reduce losses.—L. M. HEATH.

THORP, F., Jr., & HARSHFIELD, G. S. (1989). **Onion Poisoning in Horses.**—*J. Amer. vet. med. Ass.* 94. 52-53. [6 refs.]

Onion poisoning occurred in nine horses which had had access to a field of unharvested onions during winter. Seven died with icterus and anaemia, the urine being coffee-coloured. Similar results have been observed by other workers in cattle and in dogs. The eating of onions that have decayed after exposure to freezing and thawing appears to be especially dangerous.—J. A. GRIFFITHS.

BINNS, H. R. (1988). **Cottonseed Poisoning of Pigs.**—*J. comp. Path.* 51. 296-304. [15 refs.]

A ration containing 25 % cottonseed, which was fed to pigs for two weeks,

caused fatal poisoning during the 5th week after the diet was begun in 14 out of 28 pigs aged 4 to 6 months. Of 8 adult pigs one vomited and 2 had anorexia, vomiting and diarrhoea. Symptoms and lesions observed are described. It is concluded that cases of poisoning essentially similar to those caused by cottonseed cakes and meal are produced by unaltered cottonseed, and that the toxic agent is therefore present in the raw seed. The ration fed to the affected herd was deficient in protein and minerals. It is suggested that the very severe effects, produced by the comparatively small amount of cottonseed in these experiments, support the view that there exists a relation between the susceptibility to cottonseed poisoning and nutritional deficiency, particularly a deficiency of protein, iron and calcium.

—J. A. GRIFFITHS.

DE WAAL, H. L. (1938). **On the Constitution of the Bitter Principle "Geigerin" I. The Isolation of Various Degradation Acids.**—*Onderstepoort J. vet. Sci.* 10. 395-410. 2 figs. [8 refs.]

The plant *Geigeria Aspera* Harv. (Compositae) contains two active substances, one a bitter principle called geigerin ( $C_{15}H_{20}O_4$ ), and the other a substance called vermeeric acid ( $C_{18}H_{28}O_7$ ), causing vomiting disease of sheep [see *V. B.* 9. 348]. In this article the author records the results of experiments conducted on geigerin for the elucidation of its structure which may also lead to a solution of the structure of vermeeric acid since these two substances are closely related to each other.

Oxidation of geigerin by means of alkaline permanganate solution leads to the formation (1) of an acid  $C_{10}H_{14}O_4$  and (2) of oxalic acid. The nitric acid oxidation of geigerin leads to an acid  $C_{15}H_{18}O_6$  which again on oxidation with alkaline permanganate solution also yields oxalic acid. (Acetaldehyde is invariably an accompanying product in these oxidations). The  $C_{15}H_{14}O_6$  acid is a monocarboxylic dilactonic acid, which can be saponified with alcoholic potassium hydroxide to a tricarboxylic acid and is again relactonized with HCl.

Based on the information so far obtained, the view is expressed that geigerin might belong to a sesquiterpene class of substances not hitherto observed in nature; this hypothesis would explain the oxidation results by postulating a mechanism similar to that encountered in the camphor acids group.

THORP, F., Jr., & DEEM, A. W. (1939). **Suckleya Sucklejana, a Poisonous Plant.**—*J. Amer. vet. med. Ass.* 94. 192-197. 3 figs., 3 tables. [2 refs.]

This plant, which occurs around water holes in Colorado, has been found by chemical analysis to be cyanogenetic. A sample used in experiments developed 0.0864% HCN and was toxic for cattle, sheep, rabbits and g. pigs. Symptoms of intoxication developed rapidly, and were followed by death or quick recovery according to the amount consumed.—J. A. GRIFFITHS.

FULSTOW, H. (1939). **Cryptogamic Poisoning in Horses.**—*Vet. Med.* 34. 78-80. 2 figs.

A clinical description of "poisoning" by mouldy fodder. F. refers to "toxic encephalomyelitis" in horses [*V. B.* 7. 262].—J. A. GRIFFITHS.

HINDMARSH, W. L., & HART, L. (1937). **Poisoning of Cattle by Ergotised Paspalum.**—*Vet. Res. Rep., Dep. Agric. N.S.W.* 1937. pp. 78-88.

Paspalum infested with ergot (*Claviceps paspali*) has been proved to be toxic to cattle, sheep and horses. The experiments indicated that the fungus is most toxic in the stage during which the ergots are being formed, the sphacelial stage

being innocuous and the fully formed sclerotia being less toxic than the immature stage. No immunity appears to follow recovery from poisoning.

The symptoms produced were hypersensitiveness, muscular tremors, inco-ordination of muscular control, increased glandular secretions, accelerated pulse rate, and in some cases digestive derangement. The chief lesion on autopsy was distension of the meninges with a clear serous fluid.—H. B. CARTER.

## PHYSIOLOGY

- I. WRIGHT, R. D. (1937). **The Blood Supply of Newly Developed Epithelial Tissue in the Liver.**—*J. Path. Bact.* **45**. 405-414. 8 figs. on 4 plates. [7 refs.]
- II. WRIGHT, R. D. (1938). **The Blood Supply of Abnormal Tissues in the Lungs.**—*Ibid.* **47**. 489-499. 5 figs. on plate. [16 refs.]
- III. ANON. (1938). **Blood Supply of Abnormal Tissues in the Lungs.**—*Lancet*. **235**. 1868-1869. [5 refs.]

I. There are two main types of epithelial tissue in the liver: the duct tissue and the parenchymatous tissue. The ducts are supplied by capillaries of the hepatic artery, the parenchyma by the portal vein and, possibly, by the hepatic artery *via* the capillaries of the portal vein.

20 human livers were injected with a coloured gelatin mass, blue into the artery, red into the vein. In 5 livers which showed areas of regenerated tissue, the new parenchyma received its afferent supply from the portal vein, whereas in 15 livers in which secondary carcinomata and growing bile ducts were present, the hepatic artery gave rise to the new vessels.

These experiments demonstrate that the blood supply to new tissue depends, not on the proximity of the developing tissue to the field of arborisation of pre-existing vessels, but on the nature of its epithelium.

II. A number of lungs which exhibited pathological lesions were injected to show the distribution of the pulmonary and bronchial arteries in the new tissue. It was found the actively growing carcinomata were avascular, but if they (or any other type of avascular growth) later developed a fibrous area, it was supplied by the bronchial artery. Any new growth associated with fibro-vascular tissue was supplied by the bronchial artery. W. concluded from this that if a tissue develops in the lung which is usually supplied by the systemic circulation, the vessels which grow into it are derived from the bronchial circulation. This development may be directly associated with the excitation of collagenous tissue to further development of new tissue.

III. This article contains conclusions drawn from I and II; it is stated that in the lung, as in the liver, the systemic capillaries are associated with a sheath of collagenous tissue, whereas the liver sinusoids and pulmonary artery capillaries are not. In lesions where there is a growth of tissue associated with collagen fibres, whatever the exciting cause may be, there is a growth of a systemic arterial supply.—C. W. OTTAWAY.

- I. DRAGSTEDT, L. F., VAN PROHASKA, J., & HARMS, H. P. (1936). **Observations on a Substance in Pancreas (a Fat Metabolizing Hormone) which Permits Survival and Prevents Liver Changes in Depancreatized Dogs.**—*Amer. J. Physiol.* **116**. 36-37.

- II. CHANNON, H. J., LOACH, J. V., & TRISTRAM, G. R. (1938). **The Effects of Pancreatic Extracts on Fat Deposition in the Dietary Fatty Liver.**—*Biochem. J.* **32**. 1332-1344. 6 tables. [19 refs.]
- III. ANON. (1938). **The Fatty Liver.**—*Lancet*. **235**. 787. [2 refs.]
- I. A brief description of a method of preparing an alcoholic extract of ox pancreas. This extract was found to be effective in preventing and curing fatty infiltration and degeneration of the liver in depancreatized dogs adequately treated with insulin.
- II. The experiments here recorded clearly show that dilute alcoholic extracts of pancreas contain a factor other than choline which prevents fat deposition in the liver. The nature of this factor was not determined, but it was shown not to be protein.
- III. A short discussion on the above papers. It is suggested that the results obtained considerably shake the classical concept that fatty infiltration of the liver is due to a direct toxic action on the liver cells by various poisons.—N. J. S.
- BAUERNEFEIND, J. C., SCHUMACHER, A. E., HODSON, A. Z., NORRIS, L. C., & HEUSER, G. F. (1938). **A New Factor Required for Growth and Reproduction in the Domestic Fowl.**—*Proc. Soc. exp. Biol., N.Y.* **39**. 108-111. 2 tables. [6 refs.]
- A diet adequate in all known vitamins except the antidermatosis vitamin and nicotinic acid was fed to hens and chicks. After addition of these two factors as supplements to the basal diet, the hatchability and growth were not significantly improved and it was concluded that a factor is required for growth and reproduction in the domestic fowl other than the vitamins A, B, B<sub>4</sub>, B<sub>6</sub>, D, E, K, riboflavin, the chick antidermatosis vitamin, nicotinic acid, factor W, the anti-encephalomalacia factor and the essential fatty acids. The factor is present in cereals, yeast and milk and is destroyed by heating in a dry atmosphere for 36 hours at 120°C.—R. ALLCROFT.
- FOLLEY, S. J. (1938). **Experiments on the Relation between the Thyroid Gland and Lactation in the Rat.**—*J. Physiol.* **93**. 401-412 4 figs., 1 table. [17 refs.]
- As a result of the removal of the thyroids and the immediately associated parathyroid tissue of rats on the sixth day of lactation, there was a marked decline in lactation as judged by the effect on the average growth rates of their sucklings. Such rats subsequently treated with thyroxine and parathormone lactated no better than untreated, thyroidectomized rats.
- F. considers that until technique for milking out small animals and for microscopic analysis of milk has been developed, the best way of studying the role of endocrine glands in lactation is by experimenting on animals such as cows and goats. H. V. HUGHES.
- FAIRLEY, N. H. (1937). **A New Blood Pigment (Pseudo-Methaemoglobin).**—*Nature, Lond.* **139**. 588.
- A pigment, pseudo-methaemoglobin, is described by F. as existing in the blood plasma of patients suffering from blackwater fever. Spectroscopic examination has shown clearly that this pigment is distinct from methaemoglobin. Experimental evidence indicates that the plasma has the power of converting either extracorporeal haemoglobin or methaemoglobin into pseudo-methaemoglobin, and it is suggested that in severe intravascular haemolysis it is this new pigment and not methaemoglobin that is formed.—R. N. C. AITKEN.

- I. BARCROFT, J., KENNEDY, J. A., & MASON, M. F. (1939). **The Blood Volume and Kindred Properties in Pregnant Sheep.**—*J. Physiol.* **95**. 159-172. 12 figs. [6 refs.]
- II. BARCROFT, J., & KENNEDY, J. A. (1939). **The Distribution of Blood Between the Foetus and the Placenta in Sheep.**—*Ibid.* 173-186. 13 figs. [9 refs.]
- III. BARCROFT, J., KENNEDY, J. A., & MASON, M. F. (1939). **The Direct Determination of the Oxygen Consumption of the Foetal Sheep.**—*Ibid.* 269-275. 1 fig., 1 table. [12 refs.]

I. Observations were made on the blood volume, plasma volume, corpuscle volume, the haematocrit reading, the haemoglobin value per c.c. of blood, and the total haemoglobin in five pregnant sheep with three hysterectomized sheep as controls.

The blood volume increases up to about the 45th day of pregnancy and then falls until within a few days of parturition, when it reaches its greatest height. This is due to an increase in plasma volume which rises up to the 40th or 50th day, then remains fairly steady until shortly before parturition when it rises again. The corpuscle volume falls slowly until about the 50th to the 70th day when it tends to rise very slowly.

The total haemoglobin in the hysterectomized sheep showed for some reason unknown a fall during February and March followed in April and May by a rise. In the pregnant sheep the total haemoglobin was constant during the first 50 days, after which a definite fall occurred. This was followed by a gradual rise to near the normal towards the end of pregnancy.

II. The authors carried out experiments, the technique of which is described, to find the relative quantities of foetal blood in the foetus and placenta respectively throughout the period of pregnancy; they used the dye-injection method of KENNEDY and MILLIKAN [(1938). *J. Physiol.* **93**. 276].

In general the proportion of blood in the foetus to that in the placenta increases as time goes on. At 100 days about half the blood is in each, whilst at 140 days four-fifths or more is in the foetus. The cotyledons do not increase in weight after about half-way through gestation.

The flow of foetal blood through the uterus increases more or less proportionately with the weight of the foetus. At 110 days the foetal arterial pressure is about 98 mm. of mercury and at 140 days 75 mm.

The weight of single foetuses and twins is about equal at a given age up to the 135th day, thereafter the twins weigh a little less than single foetuses.

III. The authors describe a method of ascertaining the oxygen consumption of the foetal sheep. In seven experiments the average value was 0.0043 c.c. per gram of foetus per minute. That this value is higher than that previously estimated by one of the authors may be due to the fact that the cardiac outputs obtained by the cardiometer were low owing to errors in the instrument itself, and that shock and vascular collapse may have resulted from the surgical interference attending its use. Moreover a general anaesthetic was used in previous experiments, whereas in the present experiments a spinal anaesthetic was used.

The rates of blood-flow through the umbilical cord varied with the age and size of the foetus, the highest and lowest values in a foetus of 111 days being 600 c.c. and 111 c.c. per minute respectively.—H. V. HUGHES.

MASSON, G. (1938). **Hormones sexuelles et diagnostic de la gestation chez la jument.** [**Sex Hormone Diagnosis of Pregnancy in Mares**].—*Canad. J. comp. Med.* **2**. 79-88. 2 figs. [Numerous refs.] [In French].

The author reviews biological and chemical tests employed for the diagnosis

of pregnancy. The four biological tests reviewed are said to give excellent results but the author's preference is for Friedman's test, which is specific between the 6th week and 4th month. The best of the chemical tests is Cuboni's, which is rapid and remains specific until the end of gestation. The above tests are applicable to mares but not cows.—L. M. HEATH.

SATO, S., & HOSHI, S. (1938). **Reproduction in Mares. IV. Periodic Changes in the Vulva, Vagina and Cervix.**—*J. Jap. Soc. vet. Sci.* 17. 89-109 of pt. 2. 10 figs., 5 tables. [In English: Japanese summary pp. 225-227 of pt. 1]. [See also *V. B.* 5. 385].

Twelve mares bred in Korea were kept under observation for one and a half years. Oestrus was detected by means of a stallion and the changes in the ovary, vagina, vulva, and cervix were observed by vaginal and rectal examination.

(1) *Periodic changes of the vulva.* In six of the animals at the beginning of oestrus the labia relaxed, the relaxation reaching its height a few days before ovulation. Simultaneous with ovulation contraction began. The changes in the others were not so marked. The commissure became shorter gradually till the 7th day after ovulation and remained in its shortest state till 2 days before the next oestrus.

(2) *Periodic changes of the vagina.* Hyperaemia generally began one or two days before oestrus, reached its climax three or four days before ovulation, and disappeared gradually after ovulation. The amount of mucus present followed a course similar to the degree of hyperaemia; only in diseased mares was there ever a very large amount present, and in these individuals it sometimes trickled from the vulva.

(3) *Periodic changes of the cervix.* At the onset of oestrus the cervix began to swell and the enlargement reached its greatest extent as a rule about two or three days before ovulation. This was accompanied by a relaxation of the structure; this relaxation had completely disappeared by the 5th or 6th day after ovulation.

The above are the findings of the authors during normal oestral cycles in mares. The authors conclude that they are produced by the oestrogenic hormone and state that when the function of this oestrogen is too short or too slight to produce complete oestrus, mares show none or few of the symptoms except libido. They are of the opinion that the function of this hormone is not subject to the "all or none" law. During oestrus there occurs, in the following order, swelling of the cervix, hyperaemia of the vaginal mucous membrane, increase in amount of mucus, elongation of the vulva, and relaxation of the cervix. After each change reaches its maximum, retrogression occurs in the same order and is complete by the 6th or 7th day after ovulation.—J. G. MURRAY.

FLEXNER, L. B. (1938). **Changes in the Chemistry and Nature of the Cerebrospinal Fluid during Fetal Life in the Pig.**—*Amer. J. Physiol.* 124. 131-135. 1 table. [12 refs.]

Distribution ratios of Cl, Na and urea between cerebrospinal fluid and blood plasma were determined during foetal life in the pig. Up to an intra-uterine age of 40 days these substances in the C.S.F. were in equilibrium with the plasma and consequently the C.S.F. could be considered an ultrafiltrate of the plasma at this stage. In foetuses of 43 days of intra-uterine age or older, these substances were no larger in equilibrium and therefore in the three days interval between the two ages specified, the C.S.F. is believed to change from an ultrafiltrate to a secretion of the chorioid plexus.—R. ALLCROFT.

GLICK, D., LEWIN, A., & ANTROPOL, W. (1939). **Occurrence of Choline-Esterase in Swine.**—*Proc. Soc. exp. Biol., N.Y.* **40**. 28-32. 1 table. [11 refs.]

The choline-esterase activities of various swine organs and tissues were estimated, and particularly high activities were observed in the cases of the lachrymal and salivary glands, the Fallopian tubes, alimentary mucosa, and the medulla oblongata.—R. ALLCROFT.

## TECHNIQUE AND APPARATUS

JOHANNSON, A. (1938). Die Grundlagen einiger Bakterienfärbungen. [**Fundamentals of Bacterial Staining**].—*Zbl. Bakt. I. (Orig.)*. **141**. 424-442. 5 figs., 9 tables.

It is claimed that Osol's modification is superior to the orthodox Ziehl-Neelsen method. This modification consists of staining with hot, concentrated carbol fuchsin, decolorizing with 5% sulphuric acid and treating with 10% sodium sulphite in 20% alcohol. In preparing films of sputum for acid-fast staining, it is claimed that better results are obtained by using films which are not fixed but covered with boiling stain for ten minutes.

Analysing the principles of complex staining methods, J. concludes that one of three fundamental systems are always involved, *viz* :—(a) simple decolorization as with alcohol or acetone; (b) primary precipitation of the stain followed by decolorization, one agent serving the double function, as with mineral acids, and (c) mordanting with iodine or metallic salt solutions followed by decolorization with a solvent such as alcohol.

Returning to the question of the acid-fast group, the opinion is expressed that the black granules seen in tubercle bacilli after overstaining with methylene blue are true metachromatic granules and that they are the mature form of the Much granule.—E. J. PULLINGER.

RAKETTE, H. (1937). Ueber Sporenfärbungen. [**Spore Staining**].—*Arch. wiss. prakt. Tierheilk.* **72**. 338-352. [Numerous refs.]

A brief description is given of over 30 of the more important methods now in use for staining bacterial spores. In his own experience R. found both malachite green and fuchsin very efficient for staining all the various spores which he tested, and superior in facility of handling and rapidity to all the other stains; fuchsin, however, has the disadvantage of not being readily displaced by other stains. He then describes a new method which he devised for staining the spores with malachite green, which he claims to be a simplification of Wirtz's method, saving much time and labour.

WRIGHT, Elizabeth V., & KERTSEN, H. (1937). **An Apparatus for Measuring Turbidity of Bacterial Suspensions.**—*J. Bact.* **34**. 581-583. 2 figs.

A brief description is given of a simple and inexpensive photometric apparatus for determining relative turbidities in convenient numerical units. The use of the apparatus is illustrated by curves obtained from the growth of a broth culture of *Staphylococcus aureus* under various conditions.—R. ALLCROFT.

LIBBY, R. L. (1938). **The Photronreflectometer—an Instrument for the Measurement of Turbid Systems.**—*J. Immunol.* **34**. 71-73. 1 fig., 1 table.

A new optical instrument for the quantitative measurement of turbid or opalescent systems is briefly described. By it, antigen-antibody precipitation

reactions can be accurately measured and differences of as little as 0.05 mg. of suspended material may be detected. Data obtained from suspensions of  $\text{BaSO}_4$  in water are given to illustrate the accuracy and sensitivity of the instrument.  
—R. ALLCROFT.

WOOD, H. (1988). **A Tray for Dehydration, Clearing and Paraffin Impregnation of Large Quantities of Tissue.**—*Arch. Path.* 28. 582-594. 1 fig.

This tray, constructed entirely of perforated sheet Monel metal, has a diameter of  $7\frac{1}{2}$  in. and a depth of 2 in. and provides 96 separate compartments. For dehydration and clearing the whole tray is immersed in large jars containing the solutions, and then into receptacles containing "soft" and "hard" paraffin. The use of this simple apparatus thus eliminates much of the time and effort usually expended on preparing large numbers of histological sections.—R. ALLCROFT.

RIMINGTON, C., & FOURIE, P. J. J. (1988). **A Rapid Phase Test for Distinguishing between Carotinoid and Bile Staining of Fat in Carcasses.**—*Onderstepoort J. vet. Sci.* 10. 439-441. [8 refs.]

A rapid phase test is described for the differentiations of carotins and bile pigments in yellow carcasses. Two grams of fat free from blood are heated in 5 c.c. of a 5% aqueous solution of sodium hydroxide. After cooling to  $40^{\circ}$ - $50^{\circ}\text{C}$ ., add half to an equal volume of ether. A yellowish discoloration of the top ether phase indicates plant pigments and a yellowish green discoloration of the lower water phase indicates presence of bile pigments. This test therefore furnishes information concerning the presence or absence of one or both kinds of pigment.

MIRECKIĀ, O. J. (1987). **Podščet jaič v tele parazitičeskih cerveri. [A Method for Calculating the Eggs Contained in the Body of Helminths].**—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skrjabin.* pp. 396-397. 1 table. Moscow: Lenin. Acad. Agric. Sci.

The uterus of the worm is removed and placed in 10% caustic alkali to set free the eggs. The egg content is then calculated with the aid of a haemocytometer.

BRÜGGEMANN, H. (1987). **Vergleichende Untersuchungen verschiedener Flotationsmedien zum Nachweis von Leberegeleiern im Kot von Schaf und Rind. [Comparison of Various Flotation Media for the Demonstration of Fasciola Eggs in the Faeces of Sheep and Bovines].**—*Inaug. Diss., Hanover.* pp. 34. 1 table. [Numerous refs.]

Experiments were carried out to find a good substitute for water-glass solution as a medium for flotating *Fasciola* eggs. A solution of concentrated aqueous potassium hydroxide, specific gravity 1.56, was tested, but the microscope fields were blurred with air bubbles and pieces of faeces. A mixture of 100 c.c. water, 110 g. potassium hydroxide, and 110 g. of sugar was then tested and proved itself to be a good substitute for water-glass solution. It does not damage any apparatus used and mild infestations can be diagnosed with certainty. Centrifugation is recommended when it is employed.—A. L. WILSON.

FRASER, H. F., TOPPING, N. H., & SEBRELL, W. H. (1988). **The Assay of Urine in Canine Blacktongue by the Use of *Shigella paradysenteriae* (Sonne).**—*Publ. Hlth Rep., Wash.* 53. 1836-1842. 1 table. [6 refs.]

A method is described for assaying the bacterial growth-promoting properties of urine by the use of *S.p. (Bact. flexneri)* which requires nicotinic acid or its related compounds. A marked and consistent decrease occurred in the bacterial growth-promoting properties of the urine collected from six dogs after 31-52 days on a

blacktongue-producing diet; after administration of nicotinic acid to the dogs, the growth-promoting value of their urine increased or returned to normal. In every instance there was a close correlation between the results of the biological assay and the clinical condition of the animal.—R. ALLCROFT.

STEYN, D. G. (1988). **The Detection of Strychnine in Carcasses and Corpses.**—*Onderstepoort J. vet. Sci.* 10. 411-418. 2 tables. [5 refs.]

S. discusses the results of experiments carried out on 29 dogs to ascertain (a) for what period after death strychnine is still detectable in carcasses, and (b) what tests are essential for detecting the presence of strychnine. It has been definitely established that it is essential to apply (a) the taste test, (b) the colour test (Otto's test) and (c) a biological test to the materials (purified chloroform extracts) under examination, especially when only minimal quantities of strychnine are present. Certain ptomaines appear to give colour reactions and to induce spasms in white mice similar to those caused by strychnine. The view that strychnine is still detectable in carcasses for periods up to 12 years or longer after death appears to be fallacious.

### MISCELLANEOUS

EDWARDS, S. J. (1988). **Biennial Reviews of the Progress of Dairy Science. Section E. The Diseases of Dairy Cattle. I. Mastitis. II. Contagious Abortion. III. Tuberculosis.**—*J. Dairy Res.* 9. 856-877. [Num. refs.]

This review, which must be read in the original, deals with these diseases under the following headings:—mastitis—bacteriology, diagnosis, control, staphylococcal type of infection and influence of milk yield; contagious abortion—pathogenesis in cattle, pathogenicity of *Brucella abortus* for other animals, diagnosis, immunization and control; and tuberculosis—pathogenicity of *Mycobact. tuberculosis*, diagnosis, non-specific reactions to the tuberculin test, immunization and eradication.—J. E.

GODDARD, E. J. (1986). **The School of Veterinary Science, University of Queensland.**—*Qd agric. J.* 45. 444-448. 1 photograph.

The inauguration of the Faculty of Veterinary Science in the University of Queensland marked an important advance in the attack on the special problem affecting animal industry in northern Australia. The establishment of the new school was designed to meet the persistent difficulty of providing an adequate scientific veterinary personnel for research, administration and extension work. Only a Queensland veterinary school was considered able to satisfy the needs of the State in this connection.—H. B. CARTER.

ANON. (1987). **The National Field Station, "Gilruth Plains", Cunnamulla, Queensland.**—*J. Coun. sci. industr. Res. Aust.* 10. 851-852.

An experimental station of some 40,000 acres has been established capable of running 5,000 sheep. The station is under the direction of the Chief of the Division of Animal Health and Nutrition and will be used for investigations into various economic problems affecting the sheep industry, principally the control of blowfly strike, but also problems in nutrition and wool production.—H. B. C.

MELLANBY, E. (1988). **The State and Medical Research.**—*Lancet.* 235. 929-936.

An outline is given of the modern movement of state support for medical

research as seen in the activities of the Medical Research Council. The compatibility of state control of medical research with freedom to the investigator is discussed and an account is given of how state funds are used for the purpose of promoting discovery in medicine.

The Medical Research Council consists mainly of a group of experts in medical research with full authority to use and control the public money placed at their disposal, independently of all other bodies. Political influence, it is claimed, can have no detrimental effect upon the work of the Council as at present constituted, and the constant change of personnel—an individual's term of office is four years—prevents the continuance of any biased attitude on the part of the Council.

The Council relies for advice upon 27 committees composed of voluntary workers, who possess detailed technical knowledge and sound judgment. The annual state grant to the Council is now £195,000. In addition certain other funds are at its disposal for the encouragement of research.

The Council disposes of the money chiefly by the maintenance of the National Institute for Medical Research and of a number of research units at various centres, and also by the provision of grants to individual workers.

M. stresses the value of the experimental method in research, and believes that the sooner the investigator recognizes the truth of both the physiological and the invasive bases of disease and the close interaction of these factors, the quicker will be the advance of medicine.—H. V. HUGHES.

## OFFICIAL AND OTHER REPORTS

**GREAT BRITAIN. (1938). Report of the Chief Veterinary Officer of the Ministry of Agriculture and Fisheries for the Year 1937 of the Proceedings under the Diseases of Animals Acts, 1894 to 1937.—*Proc. Dis. Anim., Lond. 1937.* pp. 9-77. Numerous tables.**

Part I of the report deals with new legislation, *viz.* Part IV (Diseases of Animals) of the Agriculture Act, 1937, and the Exportation of Horses Act, 1937. The purpose and effect of the former is considered and details of the organization and establishment of the new centralized State Veterinary Service are given. The veterinary functions transferred from local authorities to the Ministry are defined, as are also the powers and duties of a non-veterinary character retained by local authorities. For the purposes of field duties, Great Britain has been divided into 78 Divisions, each in charge of a Divisional Inspector. The divisions are grouped into 22 Areas, each in charge of a Superintending Inspector. Part IV of the Agriculture Act, 1937, came into operation on April 1st, 1938.

Part II of the report deals with the incidence of notifiable contagious diseases of animals.

During 1937, 743 cases of ANTHRAX were confirmed, as compared with 468 in 1936. A table of probable origins and details of the species and numbers of animals attacked are given. There were 879 deaths, an average of 1.18 per outbreak. According to returns furnished by local authorities, 22,425 cattle were slaughtered under the TUBERCULOSIS Order of 1925 and the total sum paid as compensation was £106,477, an average of £4 15s. per head. The numbers of affected animals in the four categories were:—(a) cows giving tuberculous milk, 988; (b) cows with TB. of the udder, 6,261; (c) bovine animals with tuberculous emaciation 3,868, and (d) bovine animals with a chronic cough and clinical signs of TB., 11,850. At the end of the year there were 813 Attested Herds in England

and Wales, comprising 87,000 cattle. Details are given of the revised Attested Herds Scheme introduced on June 1st, 1987.

During the year there were 187 outbreaks (175 in England, 8 in Wales and 4 in Scotland) of FOOT AND MOUTH DISEASE. Few outbreaks occurred during the first nine months of the year, but a dangerous series commenced in October, 1987, and extended until March, 1988. The whole series is included in this report, and in addition details are given of the character and history of this disease in Great Britain, and a description of the policy and procedure for its eradication. The number of suspected outbreaks of SWINE FEVER was 11,576; of these, 982 were confirmed, as against 1,878 in 1986. Approximately 92% of the outbreaks occurred in the Scheduled Area to which the Regulation of Movement of Swine Order of 1922 applies. In the course of SWINE FEVER diagnosis 1,478 cases of SWINE ERYSIPELAS were detected, a decrease of 27.7% as compared with 1986.

There were 115 outbreaks of EQUINE PARASITIC MANGE, involving 33 counties, as compared with 111 outbreaks in 35 counties in 1986. During the year 258 outbreaks of SHEEP SCAB were confirmed as compared with 255 in 1986; the distribution was 147 in England, 70 in Wales, and 36 in Scotland. Areas to which Parts II and III of the Sheep Scab Order of 1928 were applied are described. Sixteen sheep dips were approved in 1987.

The provisions of the Warble Fly (Dressing of Cattle) Order of 1986 were not altered during 1987.

Part III deals with the new poultry orders issued in December, 1986. 78 cases of FOWL PEST (including FOWL PLAGUE and NEWCASTLE DISEASE) were reported, but in no case was disease confirmed.

Part IV deals with the subject of importation, with regard to preventing the introduction of contagious diseases of animals in Great Britain. One case of TUBERCULOSIS (as defined in the Tuberculosis Order of 1925) and 75 cases of SHEEP SCAB were found in imported animals in the landing places. Two cases of RABIES were confirmed in dogs undergoing isolation on quarantine premises. During 1987, 1,848 canine and feline animals were imported into Great Britain, including 151 performing dogs and 20 performing cats, 27 dogs for immediate re-exportation, and 85 felines (other than domestic cats) and 58 canines (other than domestic dogs) imported for exhibition. This section also deals with the operation during the year of the following orders:— Foreign Hay and Straw Orders; Markets, Sales and Lairs Orders; Diseases of Animals (Importation of Therapeutic Substances) Order; and the Diseases of Animals (Disinfection) Order.

Part V deals with the protection of animals and poultry during transit and with exportation of horses. Tables record the casualties in transit amongst animals imported into Great Britain during 1987; there were 206 casualties in 1,516,602 animals from Northern Ireland and Eire, 59 in 9,824 animals from Canada, and none in animals from the Channel Islands and the Isle of Man. The Ireland figures do not include the loss of 321 cattle due to the sinking of SS. "Lairdsmoor" as the result of a collision in fog. New legislation dealing with exportation of horses came into force during 1987, *viz.*, the Exportation of Horses Act, 1987. The effect of the new Act and the consequent order is explained.

Part VI deals with the certification of exported pedigree and other livestock, raw animal products, fertilizers, etc. Details are given of the conditions and rules which must be complied with before cattle can be sent to the London Quarantine Station. During 1987, 759 animals passed through the Quarantine Station for export to the Dominions and Colonies. Certificates of approval were issued in respect of 68 factories in connexion with the export of fertilizers and feeding stuffs to South Africa, Canada, Jersey, Guernsey and the Netherlands.

The appendixes give statistics relating to notifiable diseases among animals in Great Britain, details of contagious animal diseases in European countries in 1986 and 1987, and statistics relating to the number of animals in Great Britain and to animals imported and exported.—J. C. WALLACE.

**GREAT BRITAIN. (1988). The Work of the Veterinary Laboratory and Research Institute, New Haw, Weybridge. [ANDREWS, W. H.]—*Proc. Dis. Anim. Lond.*, 1937. pp. 77-88.**

The main activities of the Laboratory are dealt with under two headings, *viz* :—

**ROUTINE SERVICES.**—The following specimens were received for the purposes of diagnosis in suspected cases of the diseases dealt with under the Diseases of Animals Acts :—1,034 of ANTHRAX (879 positive); 1 of GLANDERS (negative); 2,600 of SWINE FEVER (1,035 positive); 14 of RABIES (2 positive); 77 of FOWL PLAGUE (all negative), and 51 of SHEEP SCAB (38 positive). The two cases of RABIES occurred in imported dogs during their quarantine period. In addition, 5,652 specimens were examined in which there was no suspicion of any of the notifiable diseases.

During the year, 22,219 doses of anti-abortion "A" vaccine were supplied and 1,775 agglutination tests carried out in connexion with BOVINE ABORTION. 217 doses of BCG vaccine were issued for use in selected herds. Sixteen cattle were immunized against PIROPLASMOSIS and ANAPLASMOSIS. 169,258 aggl. tests were conducted for PULLORUM DISEASE. 21,707 doses of FOWL TYPHOID vaccine were supplied. FOWL POX vaccine was issued for the inoculation of 273,066 poultry.

**RESEARCH.**—In connexion with CONTAGIOUS ABORTION, an investigation into the occurrence and distribution of *Brucella abortus* in the bodies of cows giving low titre aggl. reactions was in progress. Work under the Agricultural Research Council's eradication scheme was continued, and a form of brucellin was prepared and issued to Research Institutes for experimental purposes. The fate of *Br.a.* in calves, the progeny of infected "carrier" cows, and in calves artificially infected was studied.

In TUBERCULOSIS, research into infection of bovines and pigs with the avian type of *Mycobacterium tuberculosis*, and on the so-called "skin tuberculosis" was carried out. P.M. and biological examinations were made on certain cattle which had reacted to tuberculin in field tests. The value of various methods of inoculation against INFECTIOUS LARYNGOTRACHEITIS of FOWLS, the wide variation in the virulence of different strains of the virus, the viability of the virus, the efficacy of various methods of disinfection, and the susceptibility of common species of birds to the virus were studied.

Other investigations included work on the resistance of the SWINE FEVER virus, on INFECTIOUS EQUINE ANAEMIA, EPIZOOTIC ADENOMATOSIS of sheep [see *V. B.* 8. 651.] and PARASITIC GASTRITIS of sheep.

The biochemistry section dealt with metabolic disorders of farm animals. Among the conditions considered were HYPOMAGNESAEMIA, HYPOCALCAEMIA associated with HYPOMAGNESAEMIA and HYPERMAGNESAEMIA, KETOSIS in the dairy cow, and PREGNANCY TOXAEMIA and LAMBING SICKNESS in ewes. Work has been done on the veterinary physiology of copper, lead and manganese, on lead poisoning and on the therapeutic use of copper compounds and chronic copper poisoning.

Avitaminosis-A was studied in association with the National Institute for Research in Dairying, Reading. It was found that healthy pigs, anaemic pigs and

vitamin-depleted pigs were equally susceptible to *Salmonella cholerae-suis* infection.

Reference is made to the survey of poultry P.M. results carried out from 1938 to 1936, the results of which have been published [*V. B. 8. 524*]. An investigation was begun of the tumours occurring in fowls received for routine P.M. examination.

—J. C. WALLACE.

CANADA. (1937). **Report of the Veterinary Director General for the Year ending March 31st, 1937.** [HILTON, G.] pp. 46. Numerous tables. Ottawa : J. O. Patenande. [8vo].

The reputation of the Dominion for freedom from FOOT AND MOUTH DISEASE and other animal plagues prevalent in other countries has been maintained, and the small outbreaks of MANGE in cattle and horses, SWINE FEVER, ANTHRAX and GLANDERS during the period under review were promptly dealt with and controlled.

The major expense of this branch of the Department of Agriculture is in connexion with the control of bovine TUBERCULOSIS, yet all the demands for this service cannot be satisfied. To facilitate the movement of non-reacting cattle between Canada and the United States, a reciprocal agreement was arranged, the full benefits of which, however, have not been realized owing to the varying laws of the individual states.

Under the optional BRUCELLOSIS control policy, reactors to the blood test are now ear-marked, despite which there is a gradual increase in the number of herds coming under this scheme. Re-infection was only found in herds to which additions, purchased on the open market, were made.

Included in this report are the individual reports of the three divisions comprising the Branch, which are abstracted elsewhere in this *Bulletin*.—L. M. HEATH.

CANADA. (1937). [**Report of**] **Contagious Diseases Division [1936-37].** [CAMERON, A. E.]—*Rep. vet. Dir. Gen. Dep. Agric. Can., 1936-37.* pp. 8-29. Numerous tables.

Freedom from RABIES for over two years, from DOURINE for seventeen years and from SHEEP SCAB for nine years is reported. One case of SARCOPTIC MANGE was, however, reported in an isolated flock of sheep.

After one year in which no ANTHRAX occurred two small outbreaks were dealt with in the Province of Quebec; 14 animals were affected. An outbreak of GLANDERS was controlled in Saskatchewan. Mange in cattle was present in Prince Edward Island, New Brunswick, Ontario and Alberta; MANGE in horses was found in Quebec, Ontario and Manitoba. Two outbreaks of SWINE FEVER in Ontario were controlled.

Under the three plans in operation for the eradication of bovine TUBERCULOSIS, in two of which compensation is paid, more than 1,250,000 cattle were tested with tuberculin, with 85,804 reactors. The total compensation paid was \$1,089,702.79. There are now 7,827 fully accredited herds, while 1,197 are in the process of accreditation and there is a waiting list of 109. Under the Restricted Areas Plan the percentage of reactors was higher than under the other two plans, and varied from 0.1% in a district in Quebec to over 25% in one district in Manitoba. The average was about 4.5%.

For the control of BOVINE CONTAGIOUS ABORTION 1,650 herds are under supervision comprising 42,900 cattle; no compensation is paid.

Other activities of the Division were the enforcement of regulations regarding garbage feeding of swine, milk export inspection and inspection of stock yards and

cars. The remainder of the report is made up of appendices in the form of extracts of Orders-in-Council and copies of Ministerial Orders issued during the year.  
—L. M. HEATH.

CANADA. (1937). [Report of] **Meat and Canned Foods Division [1936-37]**. [BARNES, R.]—*Rep. vet. Dir. Gen. Dep. Agric. Can., 1936-37*. pp. 30-36. 6 tables.

Marked increase in cattle, swine and poultry slaughter is noted, while there was a decrease in the number of sheep slaughtered. A list of the 82 establishments operating under the Meat and Canned Foods Act is given. By Order in Council two Regulations were amended.

The remainder of the report consists of tables containing statistical data concerning cattle, sheep and swine slaughtered in the different provinces, including the condemnations, the sex of matured cattle slaughtered, the dressed weight of slaughtered animals, exports and imports of edible meats, the animal slaughter since 1908 and the diseased conditions found in animals and poultry slaughtered under inspection for 1936-37.—L. M. HEATH.

CANADA. (1937). [Report of] **Pathological Division [1936-37]**. [WATSON, E. A.]—*Rep. vet. Dir. Gen. Dep. Agric. Can., 1936-37*. pp. 37-42. 2 tables.

This report is a condensed summary of work undertaken during 1936-37, at the Animal Diseases Research Institute, Hull, two branch laboratories and a Field Station; it is divided into Biological Products, Diagnostic Services and Research. Biological products produced were tuberculin, mallein, johnin, *Br. abortus* antigen and anti-distemper serum. Diagnostic services were given on over 300,000 individual specimens originating from the domesticated animals, poultry, fur bearers and wild animals and birds. Research was undertaken on the virus of distemper, infectious bovine abortion, skin lesions (tuberculosis) of cattle, infectious mastitis, Johne's disease, tuberculosis, *Corynebacterium pseudotuberculosis* infection of horses, rheumatic and skin disease of swine, and bovine haematuria.

The cultivation of distemper virus on the chorio-allantoic membrane of chick embryos is reported. The purified protein derivative of johnin was recovered. Experimentally ammonium succinate was found to be a satisfactory substitute for the more expensive asparagin used in synthetic media for the preparation of tuberculin.—L. M. HEATH.

CANADA. (1937). **Report of the Poultry Pathology Laboratory for the Fiscal Year Ending March 31, 1937**. [WEAVER, C. H.]—*Rep. vet. Dir. Gen. Dep. Agric. Can., 1936-37*. pp. 48-46. 2 tables.

The report is a review of Poultry Conferences attended, of routine diagnostic services and of research in progress. One of the accompanying tables shows twenty diseased conditions identified, with their seasonal distribution. It is of interest to note that infectious laryngotracheitis and infectious bronchitis may be accurately differentiated and that their seasonal occurrence is quite different. The other table indicates the source and seasonal distribution of blood samples submitted to agglutination tests for *Salmonella pullorum* infection. Research was continued on the mortality in adult laying fowls and on coccidiosis.—L. M. HEATH.

CANADA, BRITISH COLUMBIA. (1938). [Report on] **Nutrition and Animal Health [1937]**. [GUNN, W. R.]—*Rep. Dep. Agric. Brit. Columbia, 1937*. pp. K65-K66.

G. suggests that proper nourishment would materially reduce losses of live-stock in British Columbia. In one district the incidence of disease conditions

including timber milk-vetch (*Astragalus campestris*) poisoning ("Knock heel") was reduced by a change of management accompanied by mineral supplements to the diet. The administration of milk was found beneficial in pregnancy disease of sheep. Following a modified plan (undisclosed) in feeding, losses in swine were reduced.—L. M. HEATH.

CANADA, BRITISH COLUMBIA. (1988). **Report of the Chief Veterinary Inspector. [1937].** [KNIGHT, A.]—*Rep. Dep. Agric. Brit. Columbia, 1937.* pp. K71-K74.

No serious outbreak of disease was reported during period under review. Sporadic cases or small localized outbreaks of the following were noted: BLACKLEG, KERATITIS in cattle, HAEMORRHAGIC SEPTICAEMIA, CALF DIPHTHERIA, pulmonary mixed infection, COCCIDIOSIS, FOOT ROT, VAGINITIS, PLANT POISONING and one case of ACTINOMYCOSIS.

The administration of a commercial bacterin was apparently beneficial in KERATITIS. The loss from COCCIDIOSIS in calves is not great but may be reduced by better sanitation and feeding after weaning. FOOT ROT of sheep might be controlled better if adequate ranges free of disease were available. No remedy has been found for VAGINITIS of cattle, the outstanding result of which is failure to conceive. Fortunately after the disease has run its course an immunity appears to be established against renewed infection. HELMINTHIASIS of sheep and swine are under control as a result of advice given farmers by the veterinary staff. Only 0.62% of over 12,000 animals reacted to the tuberculin test.—L. M. HEATH.

NEW ZEALAND. (1988). **Report of the Acting Director-General for the Year ending 31st March, 1938.** [FAWCETT, S. J.]—*Rep. Dep. Agric. N.Z., 1937-1938.* pp. 4-7. 1 table.

Since the adoption of refrigeration for meat export purposes animal production had been perhaps more intensified in New Zealand than in any other country. This intensification had brought in its train serious problems which urgently demanded investigation.

There is reference to the annual report 1936-1937, in which attention was drawn to the fact that grassland management has been more from the agronomic than the veterinary angle and was unbalanced, and also that stock losses were costing the country vast amounts annually while research into animal disease was neglected. Since that time a severe outbreak of FACIAL ECZEMA [PHOTOSENSITIZATION] had drawn attention to the need for intensified investigation of disease and to measures for maintaining the flocks and herds in a healthy condition.

—L. W. N. FITCH.

TANGANYIKA TERRITORY. (1988). **[Report on] Animal Husbandry [1937].—Rep. Dep. Agric. Tanganyika, 1937.** Pt. I. pp. 18-19.

This section deals briefly with progress in the development of herds of cattle, at the various agricultural experimental stations, for draught and milk purposes, but even more so for the production of manure and compost. A short account is given of a dairy herd at Morogoro, situated in an area infested with both East Coast fever and tsetse. By regular dipping to control the former disease, therapeutic treatment of trypanosomiasis, and stall feeding, it was proved that grade dairy cattle could be maintained usefully under very adverse conditions. The close co-operation and practical assistance of the Veterinary Department are stressed.

—S. A. EVANS.

GREAT BRITAIN. (1938). **Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1937.** pp. 235. Numerous tables, 9 appendixes. London: H.M. Stat. Off. [8vo] [8s. 6d.]

GENERAL DISEASES.—Statistics are given of information collected on UNDULANT FEVER. An investigation was in progress to explain why, if raw milk is accepted as the source of infection, many drinkers of infected milk escape this disease. PSITTACOSIS was diagnosed in seven birds from Australia. The CANCER problem is discussed.

MILK HYGIENE.—From January 1st, 1937, Local Authorities became the licensing authorities under the Milk (Special Designations) Order, 1936. Differences in administration found are the subject of comment and suggestions for improvement are given. The need for strict control and supervision of pasteurizing plants is stressed. Recent research suggests that milk-borne streptococcal epidemics may be due to milk from cows infected with *Str. pyogenes* in addition to direct infection of milk by persons engaged in its handling and distribution.

TUBERCULOSIS.—The incidence of human pulmonary TB. due to bovine tubercle bacilli is considered, and a table given summarizing the recent position in Great Britain.

MEAT INSPECTION AND FOOD POISONING.—The number of food poisoning outbreaks reported to the department was 94, as compared with 82 in 1936; 77 were investigated at the Ministry's laboratory. There were 45 cases of SALMONELLA INFECTION as the cause of acute GASTRO-ENTERITIS. Duck eggs were responsible in three and pig flesh was suspected in ten outbreaks due to SALMONELLA INFECTION. Reference is made to the effect of the Livestock Industry Act, 1937, on the future of meat inspection. The Livestock Commission is empowered to set up three experimental central abattoirs, the ultimate aim being their general establishment.

The Ministry's Laboratory issued 600 ml. of antirabic vaccine.—J. C. W.

## BOOK REVIEWS

WELLINGS, A. W. [M.D.S. (B'ham), L.D.S. (Edin.), Lecturer in Histology and Pathology of the Teeth and Associated Parts in the University of Birmingham]. (1938). **Practical Microscopy of the Teeth and Associated Parts.** pp. xxx+281. London: John Bale, Sons and Curnow, Ltd. [8vo] [12s. 6d.]

This is a book which should be available for the use of all interested in the art of histological technique.

The introduction, which in itself is worthy of publication, is a review of recent investigations, with suggestions as to the particular problems which require further attention. There are twelve chapters of which the first six deal with the preparation of material: fixing, staining, cutting, embedding, etc.; and the remaining six with the specialised dental tissues. The chapter on Fixation and Hardening is excellent.

Of the recent investigations, we would particularly draw attention to the method of cultivation of tooth germs *in vitro*, which should facilitate the study of differentiation and activity of the various tooth forming cells; and to the method of demonstration of lymphatics in dental tissues by the injection of lead acetate, followed by the application of hydrogen sulphide which fixes the injection mass in an easily recognizable form, as black insoluble lead sulphide.

A pleasing feature is that the author refers not only to the correct methods of procedure but also to the mistakes which should be avoided.—C. W. OTTAWAY.

GROSSFELD, J. [Dr Professor und wissenschaftliches Mitglied der Preuss. Landesanstalt für Lebensmittel-, Arzneimittellund gerichtliche Chemie in Berlin]. (1938). *Handbuch der Eierkunde*. [*Handbook on Egg Production*]. pp. vii + 375. 45 figs., numerous tables. [Numerous refs.] Berlin : Julius Springer. [8vo] [RM. 27].

In this book G. brings together data from the literature of many countries, dealing with production, conservation and examination of all kinds of eggs for human consumption. He deals at great length with the physiology and morphology of eggs, with abnormalities and deformities and with the chemical changes which occur after hatching. An extensive section deals with the chemical and physical properties of eggs. There are 50 pages dealing with changes during storage and the danger of infections and putrefaction ; the disinfection of the surface of eggs for storage and conservation is also discussed. Another chapter deals with the value of eggs for human consumption, illness that may follow the consumption of eggs, idiosyncrasy, etc. Infected eggs are particularly dangerous when used in conjunction with other ingredients, as in the manufacture of ice-cream, whipped cream, etc., and these are the cases which lead so often to enteritis and other forms of food-poisoning.

Other chapters deal with statistics of egg-production in Germany and other countries, food control legislation in Germany and the marking and grading of eggs. The last chapter gives instructions for the examination of eggs and egg-products.

—M. F. BENJAMIN.

RÖDER, O. [Geheimer Medizinalrat, em.o Professor der Veterinärchirurgie und der Operationslehre an der Universität Leipzig], & BERGE, E. [o. Professor der Veterinärchirurgie und der Operationslehre, Direktor der Chirurgischen Tierklinik an der Universität Leipzig]. (1939). *Chirurgischer Operationstechnik für Tierärzte und Studierende*. [*Surgical Technique for Veterinarians*]. pp. viii + 225. 136 figs. Berlin : Paul Parey. [8vo] [RM. 8.80].

This new edition closely resembles the previous one of 1935 and only details have been altered. The reviewer's opinion of the third edition [*V. B. 6. 196.*] applies equally to the fourth.—J. E.

HAGEDOORN, A. L. [Ph.D., Privaatdocent, State University, Leiden Secretary, Nederlandsche Genetisch Vereening Soesterberg, Holland]. (1939). *Animal Breeding*. pp. 304. 29 figs. London : Crosby Lockwood & Son Ltd. [8vo] [15s.]

This is essentially a book for animal breeders and farmers and does not go deeply into the science of genetics. It can therefore be understood by anyone concerned with the raising of animals. The author remarks on the false standards of judging at shows, where the animal is graded according to its appearance and not according to the worthiness of its progeny. He refers to the insufficiency of data in some stud books and shows how the situation in these respects could be improved. The book is full of practical interest for the veterinarian and contains two chapters of particular interest to him—on lethal factors and disease resistance.

—J. E.

# IMPERIAL BUREAU OF ANIMAL HEALTH

## THE VETERINARY BULLETIN

---

Vol. 9.]

October, 1939.

[No. 10.]

---

### DISEASES CAUSED BY BACTERIA AND FUNGI

- (1938). **Discussion on Bovine Mastitis.** [Speakers: HOPKIRK, C. S. M., MINETT, F. C., STABLEFORTH, A. W., EDWARDS, S. J., HENRY, M., OLVER, A. DATTA, S. C. A., KAY, H. D., WHITTY, J. D., & HAMMOND, J.]—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 62-67.

General agreement was expressed regarding the economic importance of bovine mastitis, many speakers also referring to the high incidence of infection in most countries for which data were available. HOPKIRK and KAY also referred to the difficulty of making satisfactory cheese from mastitis milk even though it showed no gross abnormality. There was some difference of opinion regarding the relative importance of streptococci, MINETT and others taking the view that it was of paramount importance and that measures should be directed firstly to the suppression of this form of mastitis, whereas HOPKIRK expressed his belief that—at any rate so far as conditions in New Zealand were concerned—staphylococci were of nearly equal importance and that other organisms, *e.g.* micrococci, often gave rise to a low grade mastitis which should not be left out of account. This difference of opinion regarding the relative importance of streptococci and in particular *Streptococcus agalactiae* has been partially if not mainly responsible for a further divergency of views between HOPKIRK on the one hand, and MINETT and his colleagues on the other; the latter believe that direct cultural examination in one or other way is necessary because infections with *Str. agalactiae* and other streptococci—in their view of prime importance—can only be distinguished in that way, while HOPKIRK believes that an indirect method which he has used on a large scale in New Zealand, *viz.* microscopic examination of films of gravity cream and assessment of the number of leucocytes, is a more satisfactory method. He also regards its cheapness and simplicity as another important advantage. That a relatively simple combination of culture and identification by serological methods is practicable was indicated by the remarks of MINETT, STABLEFORTH and EDWARDS; the latter referred to the method, which he had recently tested, of cultivating gravity cream in crystal violet broth containing sodium azide. STABLEFORTH dealt briefly with the serological aspect, quoting results to show that one serological type was nearly always preponderant in a given herd.

It was agreed that infection *via* the teat was the usual method, and that it was important to maintain good general teat hygiene by careful handling, and to treat sores promptly if they could not be prevented. HOPKIRK emphasized his

view that many latent infections are confined to the teat and sinus. Several speakers referred to the possibility of hereditary susceptibility which might be dependent on anatomical peculiarities. KAY and DATTA also raised the possibility of hormonal imbalance being an important factor. STABLEFORTH referred to the good results which followed udder infusion with entozon, or better, acriflavine, left in for five minutes in lactating animals or up to 24 hours in others. He also referred to experiments with treatment by means of sulphanilamide. MINETT also gave a description of some work he had done which showed that a toxoid might be of some value in mastitis in sheep, which was frequently of staphylococcal origin. MINETT and HOPKIRK each prepared an additional memorandum on the diagnosis of mastitis; these memoranda are printed at the end of this discussion.

DAVIS, J. G., McCLEMONT, J., & ROGERS, H. J. (1939). **Studies in Mastitis. I. The Routine Diagnosis of Mastitis.**—*J. Dairy Res.* 10. 59-73. 7 tables. [Numerous refs.]

DAVIS, J. G., & McCLEMONT, J. (1939). **Studies in Mastitis. II. A Comparison of Methods for the Detection of Subclinical Mastitis.**—*Ibid.* 74-80. 5 tables. [7 refs.]

McCLEMONT, J., & DAVIS, J. G. (1939). **Studies in Mastitis. III. Mastitis in Relation to "Udder Counts". IV. Mastitis in Relation to the Methylene Blue Reduction Test.**—*Ibid.* 81-87 and 88-93. 1 fig., 12 tables. [16 refs.]

DAVIS, J. G., & McCLEMONT, J. (1939). **Studies in Mastitis. V. Mastitis in Relation to Cheese-Making. VI. General Observations, Summary and Conclusions.**—*Ibid.* 94-103 and 104-107. 1 fig., 12 tables. [15 refs.]

I. For routine diagnosis of mastitis bromocresol purple paper tests are carried out on the fore milk, followed by mixed sampling of the early mid-milk. Samples are taken during the afternoon milking. Obviously bad quarters are sampled separately. The samples are plated immediately on returning to the laboratory on blood crystal violet aesculin agar (Edwards' medium), plain blood agar, milk agar, and occasionally other media. It is suggested that if it is only the incidence of mastitis that is under investigation, plain blood agar can be used alone. Except in obvious cases, colonies suspected to be *Str. agalactiae* are picked off and incubated in yeast dextrose litmus milk for confirmation. Further subcultures are made into hippurate broth, the hydrolysis of which is the most specific biochemical characteristic of *Streptococcus agalactiae*. Each cow is tested twice at an interval of not less than 10 days. The significance of small numbers of organisms in otherwise normal udders is obscure, but in eradication such cases are considered positive.

II. A comparison between twelve common methods, including cultural and ferment tests, of detecting subclinical mastitis revealed that none was of value for eradication purposes. It is unlikely that any combination of these simple methods would form a satisfactory method of diagnosis.

III. Observations over a long period have shown that milk samples from cows with mastitis have higher "udder counts" than those from normal cows. An investigation of this aspect was undertaken with a view to its possible usefulness in diagnosis. It was found that only rarely did a sample with a count of <100 come from an infected cow, and it was concluded that for eradication schemes this count might be taken as an indication of the absence of mastitis. A sterile plate or one with a very low count should, however, be looked upon with suspicion, as it may indicate severe mastitis or injury resulting in the presence of blood and plasma in the milk. It appears that very few uninfected cows give a count of >500 and none >2,000. In practice, therefore, a count of 1,000 may be taken as indicative of mastitis.

IV. The effect of mastitis on the methylene blue test is obscure, but it appears that changes in the chemical composition of the milk tend to lengthen the time of reduction. The test in its official form, however, is of no value for the detection of the disease.

V. Mastitis exerts a deleterious effect on milk for cheese-making. Mild mastitis lowers the lipase content of the milk and hence influences the flavour of the cheese, while severe mastitis causing definitely abnormal milk results in cheese of poor texture and weak body with low ash and calcium. Mastitis also significantly lowers the content of vitamins B<sub>1</sub>, B<sub>2</sub>, and C, and tends to inhibit the growth of starter organisms.

VI. The incidence of mastitis increases with age. There is, however, an appreciable incidence in first calf heifers. Older cows usually give milk with a higher bacterial count, but this is due entirely to the increased incidence of mastitis. It is emphasized that for eradication purposes simple tests on the farm, used in conjunction with carefully controlled bacteriological examination in the laboratory, give satisfactory results.—D. D. OGILVIE.

EDWARDS, P. R., & HULL, F. E. (1937). **Hemolytic Streptococci in Chronic Peritonitis and Salpingitis of Hens.**—*J. Amer. vet. med. Ass.* **91**. 656-660. [10 refs.]

The authors review the references made in the literature to streptococcal infections in poultry. In the outbreak reported, haemolytic streptococci were isolated from the internal organs, peritoneal exudate and inflamed oviducts. These organisms proved to belong to Lancefield's Group C.

1 c.c. of a 24-hour broth culture killed hens when given intravenously and intraperitoneally. In birds which had been injected intravenously, the lesions seen at autopsy were those of a septicaemia with slight peritonitis; intraperitoneal injections resulted in an arthritis with pericarditis. The mode of natural transmission was not clear; the pathological changes indicated the possibility of infection through the genital tract. [No mention is made of any similar condition in the genital tract of associated male birds or the isolation of a similar organism from such birds].—L. E. HUGHES.

DE BLIECK, L., & JANSEN, J. (1938). Het desinfecteerend vermogen van Citopogeen op streptococci. [Disinfectant Action of "Citopogeen" on Streptococci].—*Tijdschr. Diergeneesk.* **65**. 209-212. 9 tables. [3 refs.] [English, French and German summaries].

The authors studied the disinfectant action of "citopogeen" *in vitro* on strains of streptococci isolated from a human being, a horse, a bovine, a pig, an ape, a mouse, a raccoon and a woodcock, and found it in all cases more powerful than carbolic acid. All cultures were killed by 1% "citopogeen" within two minutes, except one strain from a silver fox, which was killed within six minutes by 1% "citopogeen", and within two minutes by 2% "citopogeen"; this strain was also more resistant to carbolic acid.—JAC. JANSEN (UTRECHT).

IVANIĆ, S. (1938). Kad se javljaju bacili prostrela u krvi? [The Time of Appearance of Anthrax Bacilli in the Blood].—*Glasn. hig. Zav.* **21**. 6-8. 2 tables. [German summary].

A series of g. pigs were inoculated subcutaneously with a suspension of virulent anthrax bacilli, in the digits of their hind-feet. The digits were then cut off after certain intervals, and the blood was tested for anthrax bacilli. It was

found that no animals survived unless the digits were cut off within 20 minutes of inoculation. Bacilli could be detected in the blood 140 minutes after injection.

—B. OSWALD (KRIŽEVCI).

IVÁNOVICS, G. (1989). Die theoretische Grundlage der Thermopräcipitationsreaktion nach Ascoli. [**The Theory of Ascoli's Anthrax Precipitation Test**]. —*Arch. wiss. prakt. Tierheilk.* 75. 75-84. [Numerous refs.]

A brief review of the present-day conception of the antigenic structure of the anthrax bacillus is given [V. B. 9. 601.], reference being made to the nucleoprotein somatic antigen which is type-specific, and to the polysaccharide capsular antigen which is common to other members of the genus. Many samples of commercially prepared anti-anthrax serum contain mainly anticapsular antibody, and such serum is unsuitable for use in the Ascoli test because it will give non-specific reactions.—E. J. PULLINGER.

JEŽIĆ, J., KODRNJA, E., & MIKIČ, F. (1988). Oko značenja kože u vakcinaciji protiv antraksa. [**Importance of the Skin in Anti-Anthrax Vaccination**]. —*Arhiv Minist. Poljopriv., Belgrade.* 5. No. 12. 8-48. 14 figs., 15 tables. [Numerous refs.] [French summary].

The importance of the skin as the site of immunity is discussed. Rabbits were vaccinated against anthrax either intradermally or subcutaneously, and their immunity was tested. It was observed that intradermal injection of the vaccine caused a higher loss due to vaccination but gave a stronger immunity. The article is a general review of the situation.—B. OSWALD (KRIŽEVCI).

BARTELS, & NICOLAUS. (1987). Milzbrandschutzimpfungen unter Berücksichtigung der Lanolin-Vakzine. [**Immunization against Anthrax with Lanoline Vaccine**]. —*Dtsch. tierärztl. Wschr.* 45. 525-527. 2 tables.

This lanoline vaccine (made by the Farbenindustrie A.G.) is rubbed into the skin after scarification. It was less effective than Besredka's intradermal method of immunization, which gave a more lasting immunity. During the years 1929-1988 there was no case of infection after immunization by Besredka's method, whereas in 1986 when the lanoline vaccine was tried, there were four fatal cases of anthrax (0.18% of the vaccinated animals).—V. CHLÁDEK (PRAGUE).

I. WIGHT, A. E. (1988). Progress and Status of Co-Operative Tuberculosis Eradication Work.—*J. Amer. vet. med. Ass.* 92. 444-450.

II. FAULDER, E. T. (1988). The Eradication of Tuberculosis in the Herds of New York State and the Accreditation of the State.—*Ibid.* 450-453.

I. During the year ended 30th June 1987, 18,750,000 cattle were tested with tuberculin under the federal scheme; the percentage of reactors was 0.7 as in the previous year. The appropriations for the year amounted to \$4,500,000 from state and \$1,500,000 from federal sources, and \$2,700,000 from federal emergency funds. On the 1st October 1987 there were 272,000 accredited herds and during the year 1st November 1986 to 30th October 1987, 98 counties qualified for inclusion as modified accredited areas, that is, the incidence of TB. had been reduced to less than 0.5%. Details are given of work carried out on the control and eradication of avian TB. A decrease in the amount of TB. found in cattle and swine at abattoirs is recorded, 0.15% of cattle and 9.8% of swine being affected.

II. In 1918 the incidence of TB. was about 40% and it was reduced by 1987 to 0.5%. 158,000 herds, consisting of two million cattle, were tuberculin

tested and retested, and compensation amounting to \$57,000,000 was paid for the 965,000 reactors. The area plan of testing was adopted and the importance of cleansing and disinfection of infected premises emphasized. Proposals for future tuberculin testing in the State are indicated.—J. C. WALLACE.

PLUM, N. (1939). **Statistical Comments on Tuberculosis and Tuberculin Tests.**—*Skand. VetTidskr.* 29. 105-132. 1 fig., 10 tables. [In English: Swedish summary].

In collaboration with veterinarians in practice and in abattoirs, a tuberculin test survey was made in different parts of Denmark and autopsies were carried out on 2,079 cattle, from tuberculous areas, which gave a reaction of not less than 3.5 mm. to the intradermal tuberculin test.

P.M. examination showed the test to give a reliability percentage of 96.73. In 68 of the carcasses no tuberculous lesions were detected. The respiratory system was more frequently involved than the digestive tract; the uterus and the udder were found affected in 2.4% and 1% respectively of the 1,894 cows examined. The number of carcasses with lesions in the head and neck glands was about the same as those affected in the mesenteric glands. It was found that the number of sites involved increased with age up to the 7-8 year class. The incidence of disease was highest in Jutland. Some breeds appear to be more susceptible than others.

Old tuberculin was used for the tests. By far the biggest reactions were given by animals up to one year old or by recently infected cattle with few lesions.—J. R.

BONGERT, I. G. (1938). Beitrag zur Pathogenese und pathologischen Anatomie der Tuberkulose der landwirtschaftlichen Nutztiere unter Berücksichtigung der Ranke'schen Lehre. [**Pathology of TB. in Domestic Animals with Reference to Ranke's Doctrine**].—*Tierärztl. Mitt.* 19. 875-879. [6 refs.]

This article consists largely of B's views on the pathogenesis of tuberculosis in cattle, in so far as they differ from those expressed in numerous articles by NIEBERLE. In particular, he does not agree with the latter's conception of an incomplete "primary lung complex" in cattle in which the lung alone shows a tuberculous focus, the bronchial glands being free. [The views expressed appear to be based on a misunderstanding of NIEBERLE's views and the only reference to his work is to the text-book published in 1931, since when many of the original statements have been modified].—E. G. WHITE.

KROGH, P. R. (1937). Kvaegbesaetning smittet med Tuberkulose fra Fasaner. [**A Cattle Herd Infected with Tuberculosis from Pheasants**].—*Maanedsskr. Dyrlaeg.* 49. 525-526.

When the cattle on an isolated farm were tested with tuberculin every autumn, there were always several reactors, and it was found that the infection was due to the avian type of bacillus. No poultry were kept on the farm, but dead pheasants from the surrounding woods were frequently found to be infected.

—H. C. BENDIXEN (COPENHAGEN).

PLUM, N., & SLYNGBORG, N. C. (1938). Smittefarlig Tuberkulose (specielt Lungetuberkulose) hos Svin. [**On the Infectivity of Tuberculosis in Swine, Especially Pulmonary Tuberculosis**].—*Maanedsskr. Dyrlaeg.* 50. 473-478.

The authors believe that tuberculosis of the uterus, udder and lungs is the most dangerous form of open tuberculosis in swine, but that tubercle bacilli may be excreted from ulcers and abscesses in some cases. In a district with a high

incidence of bovine TB., 28 % of the sows slaughtered in the abattoirs were infected and in 1.47 % of these there were macroscopic lesions in the uterus. Udder TB. is estimated to be two or three times as frequent as TB. of the uterus. In 96 cases of extensive lung TB., mucus from the trachea was homogenised and cultivated in Besredka's and Löwenstein's media; 24 % of these samples were found to contain tubercle bacilli.—H. C. BENDIXEN (COPENHAGEN).

MIHAILESCU, M., LUPU, A., & TOMESCU, V. (1988). Recherches anatomo-pathologiques et microbiologiques sur la tuberculose du chien. [**Pathology and Bacteriology of TB. In Dogs**].—*Arhiva vet.* 30. No. 5. 1-29. 16 figs. [16 refs.] [In French: German summary].

This article consists almost entirely of an anatomo-pathological study of TB. in dogs. The authors found that the disease occurred almost entirely in domesticated dogs, only one case being found in 6,000 pariah dogs. In domesticated dogs the incidence was about 2 % of 2,000 dogs examined.

The lesions were always productive in type; in fact this feature was often so pronounced that the lesions appeared almost neoplastic in nature. Exudative processes were also encountered, particularly in the pleural and pericardial cavities.

Microscopically the tuberculous reaction was characterized by epithelioid cells with a peripheral zone of lymphocytic cells. Langhan's giant cells were uncommon, and calcification was rare. Usually the tubercles were encapsulated, and new vessels could be seen. The inapparent lesions described by NIEBERLE, characterized by epithelioid proliferation, were not seen by the authors.

The primary focus was found nine times in the intestine, and five times in the lungs. Fibrous caseation was usual on the serous surfaces, and the productive character of the lesions generally shows the relative resistance of the dog to TB. The dog is considered more resistant than man or bovines.

The dissemination of the bacilli may occur by the lymphatic channels, the blood stream or by direct extension. The authors do not consider that dogs excrete tubercle bacilli commonly, as cavitation of the lungs, skin TB. and tuberculous pyelitis were not usual.

The bacteriological studies are not complete, but the authors' results to date suggest that the strains they isolated were of the human type.—D. L. HUGHES.

FELDMAN, W. H. (1988). **The Occurrence of Avian Tubercle Bacilli in Dressed Poultry.**—*J. infect. Dis.* 63. 382-386. 1 fig., 1 table. [4 refs.]

The spleens of 125 dressed poultry (66 "springers," 80 adult hens, 3 capons, 4 turkeys, 18 domesticated ducks and 4 wild ducks) were examined for tubercle bacilli by cultural methods. Avian tubercle bacilli were demonstrated in four (one "springer," two adult hens and one domesticated duck), the strains being tested for pathogenicity for g. pigs, rabbits and chickens. F. concludes that dressed poultry originating in districts where avian tuberculosis is prevalent may harbour virulent avian tubercle bacilli though the fowls are in good condition and show no macroscopic lesions of the disease. F. points out the necessity of rearing fowls in an environment free from TB.—HUGH N. SPEARS.

- I. SAENZ, A. (1988). Recherches sur les caractères biologiques du bacille tuberculeux aviaire. [**The Biological Characters of Avian Tubercle Bacilli**].—*Ann. Inst. Pasteur.* 61. 662-704. 6 figs., 6 tables. [Numerous refs.]
- II. GRIMAL, R. (1988). Variations de la formule leucocytaire et du rapport lympho-monocytaire dans la tuberculose aiguë de la poule. [**Variations of**

**the Leucocytic Count and of the Lympho-Monocytic Ratio in Acute Tuberculosis of the Hen].—C. R. Soc. Biol. Paris. 128. 655-657. 2 figs. [6 refs.]**

- III. BONNET, H., & LEBLOIS, C. (1939). Recherche du bacille tuberculeux aviaire dans les oeufs provenant de poules tuberculeuses. Absence de bacille dans les oeufs de poules infectées expérimentalement. [**Research on the Presence of Avian Tubercle Bacilli in the Eggs of Experimentally-Infected Hens].—*Ibid.* 130. 630-631.**

I. The technique of isolation of avian tubercle bacilli from bone-marrow and contaminated material and its growth on various selective media is described. A glycerinated egg base is regarded as essential for favourable results. Details are given of the varied morphology of avian tubercle bacilli as a diagnostic feature. The experimental infection of 28 pullets by ingestion of tuberculous material or cultures, confirmed the oral route as the natural path of infection. 20 strains of bacilli were injected intravenously into hens and rabbits in graded doses and the pathology of the resultant acute, subacute and chronic types of the disease is described. Four strains were found to retain their original virulence for six years after storage on selective media in the dark at room temperature. Three recently isolated strains were progressively attenuated by serial culture on glycerinated potato to which bile had been added. Dissociation on glycerinated potato is described in detail, followed by a study of the pathogenic properties of both variants and of their evolution *in vitro* and *in vivo*. The production of S and R strains of irreversible stability is demonstrated and characters are given which distinguish them from BCG strains. Pigmentation was not associated with alteration in virulence.

II. Daily leucocyte counts were performed with two hens infected with a very virulent avian strain of *Mycobacterium tuberculosis*, and compared with the average count obtained with 11 control hens. An initial lymphocytosis lasting for a week was followed by a mononuclear leucocytosis. There was a terminal polymorphonuclear leucocytosis with the disappearance of granular eosinophiles. The gravity of infection was correlated with a gradual decrease in the number of lymphocytes and in the lympho-monocytic ratio.

III. Laying hens were each injected intravenously with 1 mg. of virulent avian tubercle bacilli, and the contents of 12 eggs laid from the 12th to the 25th days after injection were sown in 1 c.c. amounts in tubes of glycerinated egg medium. Incubation at 37°C. for four months gave negative results. The yolks of eggs laid from the 5th to the 27th days after injection were injected intravenously in doses of 1-10 c.c. into 13 hens. P.M. examination after 84-270 days proved negative in every case. The authors conclude that disease in man due to the avian tubercle bacillus is rarely derived from the eggs of tuberculous hens.

—R. O. MUIR.

SAENZ, A. (1938). Caractères différentiels des bacilles isolés du cobaye neuf et des bacilles aviaires avirulents. [**Differential Characteristics of Acid-Fast Bacilli Isolated from Healthy Guinea Pigs and of Avirulent Avian Tubercle Bacilli].—C. R. Soc. Biol. Paris. 128. 594-597. 2 tables. [11 refs.]**

Two groups of 12 guinea pigs, 45 days after an intramuscular injection of smooth strains of acid-fast bacilli from healthy g. pigs in the case of one group, and of a smooth strain of avirulent avian tubercle bacilli in the case of the other, received 0.0001 mg. of rough virulent human tubercle bacilli intramuscularly. Culture on Löwenstein's medium of the spleen and sublumbar lymph nodes of g. pigs from each group, killed at intervals after the eighth day, showed that the human bacilli

spread less rapidly in the first than in the second group of g. pigs. Subdural injection of eight rabbits with acid-fast bacilli from healthy g. pigs caused death with paralytic symptoms in 16-30 days, while 17 rabbits survived a similar dose of avirulent avian tubercle bacilli by the same route. Rabbits surviving intravenous injection with the g. pig strains of acid-fast bacilli showed no lesions at autopsy after 4-6 months. Rabbits injected (intraven.) with avirulent avian tubercle bacilli showed osteo-arthritic lesions P.M. after 5-7 months.—R. O. MUIR.

VAN DEINSE, F. (1938). Nouvelles expériences de prémunition de lapins vis-à-vis de bacilles tuberculeux aviaires, au moyen de bacilles homologues, tués par chauffage. [**Experiments on the Premunition of Rabbits against Avian Type Tubercle Bacilli with Homologous Heat-Killed Bacilli**].—*C. R. Soc. Biol. Paris*. 129. 649-651. [6 refs.]

86 rabbits received 1-8 intravenous injections of 1 mg. of heat-killed avian tubercle bacilli suspended in 1 c.c. of normal saline. Of the 26 rabbits that survived, 23 received an intravenous dose of 0.1 mg. of live bacilli 5-73 days after vaccination, and three, 206 days after vaccination. Four rabbits, tested 11-59 days after vaccination, died in 7-12 days with a P.M. picture similar to that found in the seven control rabbits, which died of the acute Yersin type of tuberculosis in 15-30 days and did not show macroscopic caseous lesions. Eight rabbits, tested 5-56 days after vaccination, died after the usual interval for the benign Yersin type of TB., while thirteen died after 46-158 days, the period of survival increasing with the interval between vaccination and infection. The Yersin type of TB. (toxic infection) could not be produced by the test dose in rabbits 60 days after vaccination. In the author's opinion, vaccination with dead avian bacilli produced an allergic state followed by a gradual desensitization, rather than a true immunity.

—R. O. MUIR.

- I. AJO, C. (1938). Allergie et immunité conférées au cobaye par les bacilles tuberculeux avirulents vivants et virulents tués par chauffage (employés séparés et associés). [**Allergy and Immunity in a G. Pig Produced by Live Non-Virulent and Virulent Heat-Killed Tubercle Bacilli**].—*C. R. Soc. Biol. Paris*. 129. 759-762. 2 tables.
- II. SAENZ, A. (1939). Influence de la désensibilisation sur la dispersion des germes de surinfection chez des cobayes rendus hyperallergiques au moyen de bacilles tuberculeux morts enrobés dans l'huile de vaseline. [**Influence of Desensitization on the Dispersion of Tubercle Bacilli Causing Superinfection in G. Pigs Rendered Hyperallergic by Dead Bacilli in Paraffin**].—*Ibid.* 130. 219-222. [9 refs.]

The relation between allergy and immunity was studied in eight groups of eight g. pigs, which had been injected subcutaneously with BCG vaccine, heat-killed bacilli or a mixture of both. The allergic state was determined at weekly intervals after the final vaccination, by an intradermal test with 0.01 c.c. of crude tuberculin. Immunity was tested by the subcutaneous injection of 0.0001 c.c. of virulent bovine tubercle bacilli. BCG vaccine conferred a far greater resistance to experimental infection than heat-killed bacilli. Combined BCG and heat-killed vaccines produced an increase in allergic reaction but no increase in immunity.

II. A group of g. pigs each received intramuscularly 1 cg. of dead tubercle bacilli in 1 c.c. of paraffin. After 90 days, those g. pigs reacting to 0.0001 c.c. of tuberculin were desensitized at daily intervals by intramuscular injections of crude tuberculin in doses increasing from 20 to 100 cg., until they did not react to 0.1 c.c.

of tuberculin intradermally. They were then super-infected intradermally with 0.0001 mg. of slightly virulent human strain. The desensitized state was maintained by fortnightly injections of 50 cg. of tuberculin. Dispersion of the test dose of tubercle bacilli in this desensitized group was compared with that in an unsensitized and a sensitized group by killing a g. pig from each group at given intervals and culturing lymph nodes, spleen and lungs on a malachite-green asparagine egg medium. Similar retardation of dispersion in both sensitized and desensitized g. pigs showed that dermal sensitivity to tuberculin was not essential for immunization.—R. O. MUIR.

CARVALHO, A., & VIDAL, C. (1938). Tuberculisation de la plèvre. [**Tuberculous Infection of the Pleura**].—*C. R. Soc. Biol. Paris*. 127. 235-236.

P.M. examination of six rabbits, two months after pneumothorax, and subsequent intrapleural injection of 0.1 c.c. of a suspension of tubercle bacilli, demonstrated the presence of a general infection and pleural lesions without an exudate. Three strains recovered from the pleura were compared with the original strain by subcutaneous injection into eight g. pigs, and were shown to have increased in virulence.—R. O. MUIR.

I. LURIE, M. B. (1939). **Studies on the Mechanism of Immunity in Tuberculosis. The Role of Extracellular Factors and Local Immunity in the Fixation and Inhibition of Growth of Tubercle Bacilli.**—*J. exp. Med.* 69. 555-578. 2 text figs., 17 figs. on 3 plates, 3 tables. [13 refs.]

II. LURIE, M. B. (1939). **Studies on the Mechanism of Immunity in Tuberculosis. The Mobilization of Mononuclear Phagocytes in Normal and Immunized Animals and Their Relative Capacities for Division and Phagocytosis.**—*Ibid.* 579-606. 6 text figs., 18 figs. on 2 plates, 9 tables. [Numerous refs.]

I. The local reactions of rabbits, g. pigs and man to primary and to secondary infections with tubercle bacilli were compared. In the g. pig such reinfection produced an intense local inflammatory reaction, the surrounding lymphatic vessels being completely thrombosed with a very fine-meshed fibrin network which localized infection. In man and rabbits such localization was less effective since the fibrin network formed was comparatively coarse-meshed and the whole inflammatory reaction was less intense. It is concluded that the strong allergic reaction of the tuberculous g. pig mechanically hindered the spread of infection. In both rabbits and g. pigs which were already tuberculous, tubercle bacilli were effectively destroyed at the portal of entry by humoral antibodies, though in the same animal and at the same time these organisms might be multiplying in distant internal organs. It is emphasized that tubercle bacilli can multiply not only by binary fission, but also by splitting into non-acid-fast granules from which acid-fast rods subsequently sprout.

II. In tuberculous rabbits and g. pigs mononuclear phagocytes mobilize at the site of non-specific inflammation with greater rapidity than they do in normal animals and they increase more rapidly by mitotic and by amitotic division. Furthermore, phagocytes taken from such animals exhibit *in vitro* an abnormally high ability for phagocytosing tubercle bacilli. The increased degree of phagocytic digestion (which is dependent upon enzyme activity) is definitely not much influenced by pH effects, but depends rather upon heightened physiological activity of the sensitized animal. It is stressed that this increased activity is a definite character developed by the cells themselves and is not dependent solely upon the presence of specific antibodies (the so-called immune opsonins or bacteriotropins).—E. J. PULLINGER.

SMITHBURN, K. C. (1939). **Virulence of Tubercle Bacilli. Its Variation Attendant on Animal Passage.**—*Amer. Rev. Tuberc.* **39**. 116-127. 5 tables. [14 refs.]

S. investigated the variation in virulence of tubercle bacilli in view of its importance in the use of live virulent strains for vaccination, and the possibility of attenuated strains becoming more virulent by host-to-host passage in natural infections.

It was found that the virulence of attenuated tubercle bacilli might be partly or completely restored by serial brain-to-brain passage in g. pigs. This restoration was more complete if the bacilli were not too greatly attenuated in the first instance. In g. pigs, the increase in virulence was accompanied by an increased capacity of the bacilli to survive and multiply in these animals, and the lesions became more acute. S. claims that the virulence of cultures may be indefinitely maintained by this method.—D. L. HUGHES.

DARZINS, E. (1938). **Recherches sur l'action de l'huile de pin et de l'huile de chaulmoogra sur les bacilles acido-résistants et sur la tuberculose expérimentale du cobaye. [The Action of Pine and Chaulmoogra Oils on Acid-Fast Bacilli and Experimental Tuberculosis in G. Pigs].**—*Ann. Inst. Pasteur.* **61**. 172-186.

Cultural experiments with coliform bacilli, staphylococci and acid-fast bacilli demonstrated the superior bactericidal action of pine oil as compared with that of non-volatile oils such as chaulmoogra oil. Histological examination of the lungs of five g. pigs, after daily inhalation of pine oil vapour for three hours over a period of two months, showed slight broncho-pneumonia with marked interstitial proliferation. Another 14 g. pigs were injected subcutaneously with virulent tubercle bacilli, and eight of them were treated with pine oil vapour as above. Three of the untreated g. pigs, killed after three months, showed miliary tuberculosis of the lungs in contrast with three g. pigs which had been treated for a similar period, which showed only a slight bronchitis with marked interstitial proliferation and little caseation. The three surviving untreated g. pigs died of tuberculosis after about four months, while the five g. pigs which had prolonged treatment with pine oil vapour survived for at least eight months; at autopsy of these g. pigs there was interstitial pneumonia with cavitation and necrotic areas. Similar results were obtained in 12 g. pigs infected with tuberculosis by conjunctival instillation. D. concluded that pine oil inhibited the multiplication of tubercle bacilli in the infected lung and stimulated interstitial repair.—R. O. MUIR.

SAENZ, A., & FATIO, D. M. (1939). **Synovites tuberculeuses à bacille bovin. Intérêt de l'inoculation sous-occipitale pour établir un diagnostic précoce d'infection bovine. [Early Diagnosis of Synovitis caused by Bovine Type Tubercle Bacilli. Value of Subdural Inoculation].**—*C. R. Soc. Biol. Paris.* **130**. 624-627. [8 refs.]

Five strains of bovine type *Mycobacterium tuberculosis* were obtained from cases of synovitis in butchers. In each instance the type was established by inoculating 0.01 mg. of the original culture subdurally into rabbits, a method which serves to differentiate bovine from human strains within about 20 days.

—R. E. GLOVER.

DEBIESSE, J. (1938). **Spectres d'absorption et constitution chimique du liquide de Sauton ensemencé en bacilles tuberculeux B.C.G. [Spectrum Absorption and Chemical Composition of Sauton's Medium Sown with BCG].**—*C. R. Acad. Sci., Paris.* **207**. 1199-1201. [2 refs.]

In addition to the changes in the chemical composition of Sauton's medium caused by the growth of BCG, modifications were noted in the spectrographic picture. During the first 21 days there was a displacement in the band of absorption of the order of 300 Å with a return towards the violet during the succeeding period of growth.—R. E. Glover.

GERNEZ, C., CRAMPON, P., & GRAUX. (1938). Intérêt du milieu de Bordet-Gengou pour l'isolement et la culture du bacilli tuberculeux. [**Isolation of the Tubercle Bacillus on Bordet-Gengou Medium**].—*C. R. Soc. Biol. Paris*. **128**. 1141-1143. [4 refs.]

Three types of medium were sown with a variety of products suspected of containing tubercle bacilli. The proportion of positive results was:—Löwenstein's medium, 70%, Laporte medium, 63%, and Bordet-Gengou medium, 76%, respectively. Colonies appeared at an earlier period on the Bordet-Gengou medium.—R. E. GLOVER.

BIRKHAUG, K. (1938). **Iathergy in Experimental Tuberculosis.**—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 127-131. [In English].

B. subscribes to the hypothesis of RICH [V. B. **4**. 443.] that tuberculin allergy and resistance to TB. are separable states. This was shown by injecting g. pigs directly into the right paratracheal lymph node with about 500 eugonic tubercle bacilli.

In normal g. pigs the organisms spread throughout the body within three days. In tuberculous, allergic g. pigs, previously injected subcutaneously with dysgonic tubercle bacilli, the human strain was held up for five weeks and dispersed within 6-8 weeks, whereas in similar animals completely desensitized with a daily dose of tuberculin, dispersion was prevented for seven weeks, while the subsequent spread was slow.

The term "iathergy" is applied to the state of desensitization in which there is no interference with immunity.—R. E. GLOVER.

CORPER, H. J., & COHN, M. L. (1937). **Thermolability of the Tubercle Bacillus.**—*Amer. Rev. Tuberc.* **35**. 663-677. 3 figs., 4 tables, 2 charts. [19 refs.]

The authors describe some carefully controlled experiments on the thermal death point of the tubercle bacillus in which special attention was directed to avoiding errors in the investigations of previous workers.

The suspensions were carefully graded, and heated in a suitable buffered solution in glass receptacles which permitted an exact estimation of the temperature. Representative samples were withdrawn with precautions as to sterility at regular intervals and seeded on inspissated egg-yolk medium.

A table gives the results of temperatures ranging from 45° to 60°C. At 60°C. dilute suspensions were killed within a few minutes, while at 50°C. they survived for five hours. Between 50° and 60°C. the heat survival followed a logarithmic curve.—R. E. GLOVER.

CONE, J. F. (1939). **Pseudomonas aeruginosa [pyocyanea] in Bovine Mastitis.**—*J. agric. Res.* **58**. 141-147. 1 table. [Numerous refs.]

An account is given of an outbreak of acute mastitis affecting 17 cows belonging to a dairy herd in Beltsville, Maryland, U.S.A. Milk samples from infected quarters were found to contain fluorescent rods in apparently pure culture. Some of the animals were obviously sick, one running a temperature of 106.8°F. Milk

production was reduced abruptly, and samples of milk were watery, yellow, very lumpy and stringy.

Bacteriological features of the organisms isolated from the diseased quarters are discussed. It was concluded that in this instance *Pseudomonas pyocyanea* was probably the cause of the outbreak of mastitis. The affected quarters became "blind" in two cases, and in others they remained hard and swollen, although secreting milk of normal appearance. Some of the cows continued to shed organisms in small numbers long after the acute attack had subsided, and the milk had become normal in appearance. In view of this fact it is pointed out that the public health significance of *Ps. pyocyanea* in milk should receive consideration.

—R. ISHERWOOD.

RADVILA, P. (1937). Immunizavimas prieš kiaulių raundonligę pilnai virulentiškomis glukozidinėmis raundonligės kulturomis. [Vaccination against Swine Erysipelas by Glucoside Vaccine].—*Vet. ir Zootech.*, Kovno. 14. 257-267 and 289-300. 1 fig., 4 tables. [18 refs.] [German summary].

The effect of glucoside cultures of *Erysipelothrix rhusiopathiae* was tested on 110 pigeons and 26 pigs, 0.0005 g. saponin and 0.00025 g. digitonin (mixed) being added to amounts of culture equal to  $10^{-6}$  or  $10^{-7}$  c.c. The glucosides intensified the pathogenic action of the organism and lowered its lethal dose, so that R. considers the glucoside method to be useless in swine erysipelas immunization.—A. PABIJANSKAS (KAUNAS).

ROSENBUSCH, C. T., & MERCHANT, L. A. (1939). A Study of the Hemorrhagic Septicaemia Pasteurellae.—*J. Bact.* 37. 69-89. 3 tables. [Numerous refs.]

The authors studied 114 strains of H.S. organisms (38 avian, 22 bovine, 18 ovine, 15 porcine, 7 buffalo, 7 equine, 4 rabbit and one each of deer, cat and mink); 44 of these strains are discussed.

A brief review is given of the literature on previous classifications of the members of the pasteurella group. The authors next detail the various techniques of the tests upon which they base their own classification. Pleomorphism obviated typing by morphology. Colony characters also fluctuated, but granular or floccose precipitation in broth cultures was usually associated with avirulence. Haemolysis gave two main groups. In dye bacteriostasis, culture tests with crystal violet showed that avian strains were usually more resistant.

The authors determined two main groups of the organisms, by cultural, biochemical, serological and pathogenicity tests. The first group consisted of typical non-haemolytic strains, divisible into two sub-groups and a third rather indistinct sub-group by fermentation tests in xylose, arabinose and dulcitol and by agglutination reactions. However, repetition of these tests over a period of two years showed that complete variation from one set of group reactions to another did occur with some strains. The second group contained atypical haemolytic strains [*Past. haemolytica*, described by NEWSOM and CROSS—(1932). *J. Amer. vet. med. Ass.* 80. 711].

Two types of variability are described. Permanent variants included rough and mucoid forms. Temporary variants, eight of which are described, suggested cyclic changes which might account for the conflicting results of many previous investigators.

The species classification is discounted and the name *Pasteurella multocida* Kitt 1885 n. comb. is suggested for all typical non-haemolytic strains.—C. V. W.

BRUHL, L. (1938). Les pasteurelloses en pathologie comparée; l'infection pasteurellaire chez l'homme. [*Pasteurellosis in Comparative Pathology; Pasteurella Infection in Man*].—*Rev. Path. comp.* **38**. 1235-1267. [Numerous refs.]

The bacteriology of the group is discussed. A brief historical note is given on pasteurellosis in animals. Unfavourable hygienic and climatic conditions predispose to infection. The various types of the disease are mentioned.

The organism also plays an important role as a "microbe de sortie". The chronic infection is rare in man.—F. H. MANLEY.

POSTMA, C. (1938). Kan bac. tularense den mens per os infecteren? [*Possibility of Peroral Infection in Man with Tularaemia*].—*Tijdschr. Diergeneesk.* **65**. 213-216.

After a study of the literature on the subject, P. came to the conclusion that peroral infection with tularaemia occurs in man.—JAC. JANSEN (UTRECHT).

ROSATI, T. (1938). Il paratifo dei bovini in Sicilia. [*Bovine Paratyphoid in Sicily*].—*Azione vet.* **7**. 342-352. 2 figs., 4 tables. [Numerous refs.]

Several outbreaks of bovine paratyphoid are described, mainly occurring in herds kept in poor hygienic conditions. The organisms found were typed as *Salmonella enteritidis* var. *dublin* and *S.e.* var. *rostock*. The infection was found in old as well as in young cattle and was often associated with purulent arthritis. About 148 animals were infected of which about 34 died, and the rest recovered after treatment with serum and vaccine.

EDWARDS, P. R., & BRUNER, D. W. (1938). Two New *Salmonella* Types Isolated from Fowls.—*J. Hyg., Camb.* **38**. 716-720. 2 tables. [10 refs.]

Two new salmonella types are described, *S. minnesota* and *S. worthington*. The former was isolated from a three-weeks-old poult and the latter from a young turkey and a chick. They do not appear to be identical with any other strains previously described. The cultural characteristics, carbohydrate reactions and antigenic formulae are given. [No information is given as to the relationship of these organisms to disease in the birds from which they were isolated].—H. N. S.

JUNGHERR, E., & CLANCY, C. F. (1939). Serologic Types of *Salmonella* Isolated from Paratyphoid in Chicks.—*J. infect. Dis.* **64**. 1-17. 2 tables. [Numerous refs.]

In a routine examination of 1,241 chicks under 3 weeks old, the authors found 15 cases of infection with the paratyphoid bacteria mentioned below. Ten of these were from pullorum-free stock. Of the 14 strains studied serologically four were classified as *Salmonella typhi-murium* according to the Kauffman-White scheme. Two were classified as *S. typhi-murium* var. *binns*, one as *S. bareilly*, two as *S. oranienburg*, three as *S. montevideo*, one as *S. anatum*, and one as *S. london*. So far as the authors are aware *S. bareilly*, *S. montevideo* and *S. london* have not been recorded before as occurring in man or animals in the U.S.A. Analysis of the antigenic structure of *S. montevideo* confirmed its inclusion in the vi, vii group, and that it is monophasic. The specific phase was found to contain m t g o s, of which g o s was deficient in absorbing capacity.—A. A. B. ELLIS.

BOYCOTT, J., & McNEE, J. W. (1936). Human Infection with the American Hog-Cholera Bacillus. A Third Example in England.—*Lancet*. **231**. 741-742. [Numerous refs.]

A fatal infection in a woman with *Salmonella cholerae-suis* is described. The source of the infection was not established.

STANDFUSS, R., & KOCH, R. (1937). Untersuchungen über die Brauchbarkeit der von Hohn und Hermann empfohlenen Hottinger-Stierhodenbouillon sowie der Ammon-Nährboden für die Unterscheidung und Einteilung der Keime der Paratyphus-Erteritis-Gruppe. [**The Value of Different Media for the Differentiation of the Paratyphoid Group**].—*Z. InfektKr. Haustiere*. **52**. 35-43. [8 refs.]

The authors advocate the use of bovine testicle broth and Simmons' ammonium medium for the growth and identification of salmonella. The latter medium consists of agar to which is added a mixture of sodium-ammonium phosphate 0.15 %, potassium phosphate 0.1 %, and  $MgSO_4$  0.02 %, fermentable substances as eventually required, and bromthymol blue 1.5 %.—E. J. PULLINGER.

FITCH, C. P., & DODGE, Ruth E. (1939). **Horses as Possible Means of Spread of Bang's Disease among Cattle**.—*Cornell Vet.* **29**. 29-31. 1 table.

Conditions were studied on eighty *Brucella abortus* infected farms. The first group of 40 farms had 29.2 % reactors among 1,055 bovines ; at least one horse on each farm had an agglutination titre of 1:250 or higher. In the second group of the remaining 40 farms, 17.1 % of 791 cattle reacted on test ; the serum of the horses on these farms was negative at 1:25. At the end of the period of testing reported on, the herds were roughly the same in size, but infection in the first group was 3.7 %, while in the second group it was only 0.5 %. The authors suggest that this evidence is an indication that the disease is transmitted from horses to cattle, and that infected horses which are allowed to remain on a farm are a potential hazard.—J. A. GRIFFITHS.

ANON. (1938). Plan de lutte contre les brucelloses. Avortement epizootique. Fièvre ondulante humaine). [**Control of Brucellosis in Man and Animals**].—*Arch. internat. Brucelloses*. **1**. 180-185.

It is recommended that public notices should be issued in the department of Ardèche offering a bonus for first notifications of abortions in goats, sheep or cattle. On receipt of notifications at the central office (the municipal authority of each village), practising physicians of the district would be warned and invited to report all suspected cases of undulant fever to the "authorized centre" and forward material for laboratory examination. These arrangements should also be adopted in neighbouring departments.—S. J. GILBERT.

KARSTEN. (1937). Ueber die bei der Bekämpfung des Abortus-Bang gemachten Erfahrungen. [**Experience in Control of Bovine Brucellosis**].—*Dtsch. tierärztl. Wschr.* **45**. 639-641.

In the course of a general discussion on the question of the control of bovine contagious abortion by segregation based on blood tests, K. describes the results obtained to date in the voluntary scheme which was begun in Hanover about four years ago. In July, 1937, the scheme included 4,126 herds, comprising 30,984 cattle. Of these, 588 herds had passed four successive tests, 1,777 herds, three, and 2,168 herds, two, whilst 2,346 herds had passed one test. 397 herds had already been registered as abortion-free, and cattle from these are specially marked in sale catalogues. Whole districts are being attacked. No special difficulty has been found in keeping herds free, provided that no adult females are introduced except from clean herds, that no adult females are allowed on common pastures, that reactors are removed, and that the prescribed regulations are carried out. Herds with 10-15 % reactors are usually dealt with fairly easily, but greater difficulty was experienced in the case of herds with higher percentages of infected animals,

particularly where separate premises were not available. K. supports the view that in badly infected herds, more use might be made of attempts to rear a new, clean herd from young animals.

For diagnosis Meinicke's reaction is regarded as equal to or slightly more sensitive than the agglutination or complement-fixation reaction. Calf vaccination is not regarded with favour, K. taking the view that further evidence is needed that it does not lead to infection and/or reactions.

In conclusion, K. states emphatically that eradication on the basis of blood tests is the way in which the disease should be dealt with.—A. W. STABLEFORTH.

SEELEMANN, M., WOLF, C. H., & PFEFFER, A. (1938). Versuche einer Beeinflussung der Abortus-Bang Infektion mit Hilfe von Serobortan und D-Vakzine. [**Attempts to Treat Contagious Abortion with "Serobortan" and D-Vaccine**].—*Tierärztl. Rdsch.* 44. 615-620. [12 refs.]

In two brucella infected herds 50 cows and 5 bulls positive to the blood and flocculation tests, and 28 non-reacting cows and 17 non-reacting bulls were inoculated with a substance named "serobortan" together with a vaccine. The former substance is described as a protein-lipoid mixture containing chemical elements. 74 uninoculated non-reacting animals (52 cows and 22 bulls) were kept as controls. During the year the experiment continued. 5 of the 52 untreated negative cows developed titres over 1:50, while all the 28 negative cows treated remained negative. Of the uninoculated non-reacting bulls 18 became positive and 21 remained negative. The blood titres of the original positive reactors did not fall appreciably after vaccination, and abortion was not prevented.—P. S. WATTS.

- I. BELL, F. N., & IRWIN, M. R. (1938). **Studies on the Variation of the Blood Cells of Cattle in Health and During Brucella Infections.**—*J. infect. Dis.* 63. 251-262. 6 figs., 2 tables. [5 refs.]
- II. IRWIN, M. R., & BELL, F. N. (1938). **The Interrelationships of the Blood Cells of Cattle in Health and During Brucella Infections.**—*Ibid.* 263-268. 1 table. [8 refs.]

I. Total red and white cell counts as well as differential counts were made at irregular intervals in a herd of 35 animals, including 14 which were "ceased reactors" from a previous infection. On the ninth day after artificial exposure to infection, weekly counts were made in 22 of these animals, including 11 "ceased reactors", over a period of 7-8 months. Both resistant and susceptible groups (*i.e.* whether producing calves at full term, or aborting) showed a significant decrease in the total red and white cell counts after infection. A definite increase in the average percentage of polymorphonuclear leucocytes followed infection in both groups. An increase in the average percentage of monocytes was noted, slight and not significant in the resistant group, but very marked in the susceptible group. The average percentage of lymphocytes at all times was in almost direct inverse proportion to that of the polymorphonuclear leucocytes.

Blood from 19 reactors from another herd was examined weekly for 10 weeks; in these animals there was a marked increase in the percentage of monocytes.

II. Analysis of the interrelations of the various blood cell types for each group, described in the preceding paper, showed that the total white cell count was positively, but not always significantly, correlated with the total red cell count. In infected cows, there was an appreciable association of the total white cell count with the percentage of monocytes, but this was not observed in normal animals. In the infected animals, the proportion of monocytes was negatively associated with the percentage of eosinophiles and in the susceptible group with that of the polymorphs.—R. O. MUIR.

ARIEL, M. (1987). K patologiĉeskoj morfologii brucelleza u abortirovannykh plodov ovec. [**On the Morbid Anatomy of the Aborted Sheep Foetus in Cases of Brucella Infection**].—*Brucellosis in Sheep*. pp. 151-155. 2 figs., 1 table. [8 refs.] Moscow : Viem Publ. Dept.

Autopsy of the foetuses of 22 ewes which had aborted from naturally acquired brucellosis on the Experimental Sheep Farm in North Caucasus, revealed acute inflammatory lesions in the umbilical cord. Foetuses from normal ewes were not examined, however, so there was no comparison with healthy animals. The most outstanding morphological changes in the aborted foetuses were found in the liver in the form of numerous necrotic foci, or of a diffuse interstitial hepatitis; in the latter case the liver cells were compressed by the elements of the granulating tissue, and gradually became atrophied. Wide-spread necrotic foci were sometimes found also in the cortical layer of the adrenal glands, but in the majority of cases the cortical layer contained focal accumulations of polyblasts and polymorphonuclear leucocytes; in such nodules there were necrotic areas. In many foetuses sharply defined inflammatory changes were found in the connective tissue surrounding the lymph nodes. In the lymph nodes a generalized hyperplasia of the reticulo-endothelial elements was commonly observed, similar to that found by A. in the lymph nodes of ewes which aborted from natural or experimental brucellosis. Sometimes a condition of generalized broncho-pneumonia was observed in the foetuses, apparently due to the aspiration during parturition of the amniotic fluid and of vaginal secretions of the mother. There was marked hyperaemia of the spleen pulp. Nothing characteristic was observed in the heart or kidneys.

DERVILLEZ. (1988). Les brucelloses peuvent-elles déterminer l'avortement chez la chienne? [**Brucella as a Possible Cause of Abortion in Dogs**].—*Rev. Path. comp.* 38. 790-792.

D. speculates as to the causes of abortion in six bitches, and wonders whether it may have been due to brucella infection. He produces no evidence.—C. V. W.

PRIESTLEY, F. W., & McEWEN, A. D. (1988). **The Toxicity of Br. abortus for Mice**.—*J. comp. Path.* 51. 282-289. 9 tables. [11 refs.]

*Br.a.* inoculated intraperitoneally or intravenously in suitable doses into mice has a toxic action and usually results in death within four days. This does not occur after subcutaneous inoculation.

If non-virulent strains are used, larger doses are required to produce death. The toxic effects are neutralized by immune serum, and a smooth antiserum protects against smooth but not against rough strains. The experiments indicate that the toxicity is proportional to virulence and is not related to smoothness or roughness. It is suggested that mouse inoculation might prove a rapid method of estimating virulence, although it is not a more sensitive test than can be performed with g. pigs. The authors discuss the cause of the toxicity and its relation to virulence.—S. J. GILBERT.

MAZZARACCHIO, V. (1987). La brucellosi. Infezione professionale dei veterinari. [**Brucella Infection in Veterinarians**].—*Azione vet.* 6. 868-869. 1 fig., 4 tables.

This is a general description of the research that has been done on brucellosis by different workers, and also a discussion of the infection in man, which is mainly a repetition of the articles by A. THOMSEN [*V. B.* 8. 207 and 582].

WOLTER, F. (1937). Zur Frage der Aetiologie und Prophylaxe der Bangschen Krankheit. [**Aetiology and Prevention of Human *Brucella abortus* Infection**].—*Berl. tierärztl. Wschr.* Sept. 3rd. 549-551.

W. first discusses two cases of undulant fever in man, of which one occurred coincidentally with a fatal infection believed to be due to brucella (titre 1:3000) in a bitch, and the other following a bite by a dog with a titre of 1:4000. He also records agglutination tests made on the personnel on a large estate where a typical case of U.F. had occurred. Seventeen individuals who had "no contact" with infected animals all gave negative results. Of 67 who had no contact with infected animals but drank their milk raw, 4 showed "evidence of latent infection", whilst of 22 individuals who had worked with aborting animals, 7 "gave a positive result". W. also discusses at some length his idea that infection is acquired by the respiratory route, apparently associated in some way with ground and climatic conditions, and not by contact or ingestion.—A. W. STABLEFORTH.

ANON. (1938). Die in den Jahren 1936 und 1937 bekanntgewordenen Erkrankungen bei Menschen infolge Infektion mit *Brucella abortus* Bang. [**Statistics of Known Cases of Human *Br.a.* Infection in Germany in 1936 and 1937**].—*Reichsgesundheitsblatt.* 13. 908-909. 4 tables.

Statistical data are presented showing that the number of cases of human infection with *Br.a.* treated in hospitals in Germany was slightly greater in 1936 and 1937 (587 and 586 respectively) than during the five preceding years. The majority (425 and 895 respectively) occurred in Prussia, with a marked predominance among agricultural workers. Raw milk and dairy produce appeared to have been somewhat more frequently the source of infection in 1937 than in 1936. In the two years *Br.a.* infection resulted in the death of three women, one 18-month-old boy, and three men. *Br.a.* was successfully cultured from the blood of patients 44 times in 1936, and 39 times in 1937.

D'AGATA, A. (1938). Sui metodi di differenziazione dei tipi del genere "Brucella", con speciale riguardo a quello recentemente proposto da Izar e Famulari. [**Comparison of Methods for Differentiation of Brucella**].—*G. Batt. Immun.* 20. 64-77. 1 table. [16 refs.] [English, French and German summaries].

Izar and Famulari's method of differentiating the three types of brucella [*V. B.* 9. 300.] proved valueless when used by the author, who also came to the conclusion that Petragani's medium with thionin is inferior to that recommended by Meyer and Zobell [*V. B.* 3. 466].—A. J. CASSAR.

STEUER, W., & VON BOCK, K. (1938). Zur Frage der kulturellen Typendifferenzierung in der Gruppe "Brucella". [**Cultural Differentiation of the Brucella Group**].—*Klin. Wschr.* 17. 158-159. 1 table. [6 refs.]

Izar and Famulari's method of typing members of the *Brucella* genus according to their resistance to lactic acid [*V. B.* 9. 300.] could not be confirmed. On the other hand, the methods of typing on Petragani's medium, and Schwarzmaier's method [*V. B.* 7. 921.] were found of considerable value.—E. J. PULLINGER.

SEREN, E. (1937). Sull'inoculazione della *Br. abortus bovis* e della *Br. melitensis* nella cavia per via endotesticolare a scopo differenziale. [**Attempt to Differentiate *Br.a.* and *Br.m.* by Intratesticular Inoculation of Guinea Pigs**].—*Nuova Vet.* 15. 183-187. 3 tables.

Three series of experiments were carried out to differentiate *Br.a.* from *Br.m.*

by means of intratesticular inoculation of g. pigs, but the clinical symptoms and histopathological lesions observed did not furnish constant and reliable results.

—A. J. CASSAR.

WATTS, P. S. (1938). **Note on the Isolation of *Cl. tetani* from the Intestines of Normal Sheep in Cambridgeshire.**—*Brit. J. exp. Path.* **19**. 422-424. [7 refs.]

*Cl. tetani* was found in the intestines of 5 out of 32 sheep examined. YOUNG [(1927). *Brit. J. exp. Path.* **8**. 226.] had found that Cambridgeshire and district showed a high infection rate for tetanus in man. The author wished to ascertain if this organism could be found in a large number of sheep in the district. The percentage of sheep found to be harbouring *Cl. tetani* was no higher than that recorded elsewhere.—A. A. B. ELLIS.

LOVE, W. G., MILLAR, J. A. S., & RAWLINGS, W. B. (1938). **Gas Gangrene (*Clostridium Welchii*, *B. Perfringens*) Infection in the Dog.**—*N. Amer. Vet.* **19**. No. 11. 51-60. [Numerous refs.]

An account of the isolation of *Cl.w.* from a gas gangrene lesion in a dog.

—D. D. OGILVIE.

FENSTERMACHER, R., & POMEROY, B. S. (1939). ***Clostridium* Infection in Turkeys.**—*Cornell Vet.* **29**. 25-28. [7 refs.]

Anaerobes were isolated from two turkeys out of a flock in which there had been a mortality rate of about 2% for 4-5 years. The losses were in hens and had occurred at the beginning of the breeding season. A suspension prepared from the livers and spleens of the two birds was injected into two turkeys, six g. pigs and two rabbits. The two turkeys and two of the g. pigs died in 48 hours; in the remaining animals there was swelling at the site of inoculation, but all recovered.

*Cl. welchii*, *Cl. septique*, and *Cl. sordellii* were cultivated from the livers of a naturally infected turkey, one of the artificially infected turkeys and one of the artificially infected g. pigs.—W. J. IRONSIDE.

DALLING, T., & ROSS, H. E. (1938). ***Clostridium welchii*: Notes on the Relationship Between the Types of Cultures and the Production of Toxin.**—*J. comp. Path.* **51**. 235-249. 1 table. [Numerous refs.]

Using sera in which the proportions of the antibodies to the various toxins of the *Cl.w.* group were known, the authors employed the haemolytic tests for  $\alpha$  and  $\beta$  toxins and the mouse intravenous test for  $\beta$  and  $\epsilon$  toxins, in assessing the potency of the toxins produced by this group under various conditions. For the production of  $\alpha$  toxin a meat broth medium containing 50% of minced meat was the most successful, while only 10% of meat was to be preferred for  $\beta$  or  $\epsilon$  toxins. Each of these is best harvested after a short period of rapid growth. The  $\epsilon$  toxin was produced in highest concentration after four to five days incubation in a medium containing 50% of meat. The addition of glucose or trypsin, the period of incubation, the pH and the volume of medium affected the relative proportions of each type of toxin in cultures yielding more than one type. From lambs dying of enterotoxaemia types B and D were isolated. The D type occurred in the stomach and duodenum and the B type in the ileum.—P. S. WATTS.

I. WALBUM, L. E. (1938). **The Importance of Hydrogen Ion Concentration in Haemolysis by the Lysins of Anaerobic Bacteria.**—*J. Path. Bact.* **46**. 85-98. 4 tables, 5 charts. [4 refs.]

- II. KLIGLER, I. J., & GUGGENHEIM, K. (1938). **The Influence of Vitamin C on the Growth of Anaerobes in the Presence of Air, with Special Reference to the Relative Significance of EH and O<sub>2</sub> in the Growth of Anaerobes.**—*J. Bact.* **35**. 141-156. 2 figs., 9 tables. [Numerous refs.]

I. Broadly speaking these haemolysins are of two types; in type A there is an optimal pH point, with decreasing haemolysis on both sides of this pH; in type B there is a pH point coinciding with minimal haemolysis with increasing haemolysis on both sides of this pH. In some cases the haemolytic process may be due to a combination of these two types, *i.e.*, with maximal and minimal points of haemolysis.

The technique used is briefly described. Two series of experiments were devised, one in which homologous serum was the buffer used and another with phosphate as the buffer. When serum was used as the buffer the effect of pH on the lysis of *Clostridium welchii*, *Cl. oedematiens* and *Cl. tetani* was uniform, *i.e.*, haemolysis diminished with increasing pH; whereas *Cl. septicum* however was found to belong to the B type of haemolysins (minimal activity at about pH 6·8 with increasing activity on both sides of this). When phosphate was used as the buffer no change was seen in the process so far as *Cl.o.* and *Cl.t.* were concerned, but a marked change was seen in the case of *Cl.w.* (causal organism of lamb dysentery) and *Cl.s.*, which both behaved as type A with a point of maximal activity at pH 7·2-7·3 with decreasing activity on both sides of this. The effect of variation of pH on the stability of the lysins was determined and also their respective points of greatest stability. In a number of cases the pH of greatest stability did not coincide with the pH required for maximal haemolysis.

II. The work done upon this subject is discussed. The preparation of the medium used is given. Vitamin C was added in varying proportions. No growth of *Cl.w.* occurred under aerobic conditions where the concentration of vitamin C was less than 0·02% and amounts greater than 0·02% did not influence the growth. The addition of glucose to the medium made no difference to the minimum quantity of ascorbic acid required for growth; above this minimum glucose acted as a nutrient and enhanced the growth. On the addition of peptone to the medium a smaller amount of vitamin C was required, and also growth was intensified. Thus peptone had a double action, in that it produced reducing agents and also acted as a nutrient.

The vitamin C used up in the media was estimated; it was found that loss was greater in the un-inoculated tubes than in the inoculated ones. The total quantity of vitamin C lost was found to be the same with concentrations used. The presence of glucose in the media made no difference to the rate of loss, but peptone acted as a protective: that is, the more peptone present the less ascorbic acid lost.

The intensity of oxygen reduction potential paralleled the increasing concentration of vitamin C. Glucose did not influence the reduction; peptone exerted a reducing effect.

Growth occurred in tubes in which the oxygen tension was equal to 95% of the normal, provided that an adequate amount of vitamin C was present. Vitamin C lowered the oxygen potential, but did not appreciably affect the oxygen tension. The reduction potential at which growth occurred was -0·125V.—L. E. HUGHES.

MOSER, F. (1937). Untersuchungen über die Einwirkung von Rindergalle auf einige Bakterien- und Virusarten. [The Action of Ox-Bile on Bacteria and Viruses].—*Zbl. Bakt. I. (Orig.)* **140**. \*180-188.

This paper deals with studies in the attenuation and final destruction of certain bacteria and viruses by ox-bile. The virus of fowl plague was inactivated

after 48-72 hours by raw ox-bile, whilst sterilized bile killed the virus after 24 hours. Similar results were obtained with the virus of swine fever; organisms of the haemorrhagic septicaemia group in bile were killed within 24 hours when kept in a refrigerator. M. does not give the results of his tests on the viability of salmonella in ox-bile. He merely states his disagreement with the opinion of others [no reference] that ox-bile is lethal for salmonella. The pH of the bile plays a certain part in the destruction of bacteria.—M. F. BENJAMIN.

BALDACCI, E. (1937). Contributo alla sistematica degli Actinomyceti. I. Sull' Actinomyces bovis Harz e sull' Actinomyces sulphureus Gasp. [A Contribution to the Systematic Classification of the Actinomycetes. I. *A.b. Harz* and *A.s. Gasp.*].—*Atti Ist. bot. Univ. Pavia*. 9. 248-271. 2 figs. [Numerous refs.] [English and Latin summaries].

B. discusses the nomenclature of *A.b.* [see, however, M'FADYEAN, *V. B.* 4. 19]. In 1894, GASPERINI pointed out that the name *A.b.* could not be applied generally to all the organisms isolated from lesions in cattle, and suggested that it should be abandoned. He divided the organisms into four groups, the chief, in his classification, being *A.s.*

B. undertook a revision of the whole position, beginning with *A.s.* since it resembles as closely as any the organism originally described by HARZ. Eight strains were obtained from various laboratories and their cultural and morphological characteristics were compared. The majority of the strains were labelled *A.b.*

All the strains, with the exception of two, grew readily on Pollacci's medium (pH 6.7) at 25°C., and after seven days' incubation developed dew-drop colonies which later coalesced forming a delicate network over the surface of the medium; vegetative filaments did not appear constantly. All the strains, with one exception, formed circular colonies on potato. These became covered with sulphur yellow vegetative filaments which developed slowly but abundantly. All the strains grew on serum agar and grew in and liquefied gelatine, and converted starch to dextrin. Only one strain could be induced to grow under anaerobic conditions.

The morphology of all the strains was similar, the organisms appearing as fine, branching filaments less than 1  $\mu$  in thickness from which there developed erect spiral vegetative filaments, yellowish brown in colour and exceeding 1  $\mu$  in thickness. These bore yellow arthrospores more than 2  $\mu$  in circumference. On solid media, thick, diffuse colonies adhering to the substrate developed, changing in colour from yellow to black, and were often, though not always, covered with sulphur-yellow vegetative filaments.

B. holds that these results indicate *A.s.* and *A.b.* to be identical, and that since GASPERINI was the first to describe the organism accurately, his name for it should replace all others.—J. A. NICHOLSON.

STEWART, R. A., & MEYER, K. F. (1938). Studies in the Metabolism of *Coccidioides immitis* (Stiles).—*J. infect. Dis.* 63. 196-205. 4 tables, 2 graphs. [Numerous refs.]

A study of the metabolism of *C.i.* was undertaken in order to develop a synthetic medium with selective properties. The nitrogenous metabolism and glucose assimilation were studied in the double strength veal infusion broth of van Ermengen and it was found that ammonia increased in all cultures. The presence of glucose had a protein-sparing action in that protein hydrolysis was slowed, but the production of ammonia was not affected. Fatty acids diminished in the presence of glucose as well as in its absence. Although glucose was assimilated, the pH of

the medium tended to rise, and in studying this phenomenon it was found that changes in the pH occurred independently of glucose consumption and are to be explained by variation in the consumption of other constituents. In the construction of a synthetic medium it was found that ammonium salts were a suitable source of nitrogen, and that acetic acid would supply the carbon. A medium used for isolation of *C.i.* from soil consisted of ammonium chloride and sodium acetate. The medium had selective properties but was not specific as other moulds grew sparingly in it. When used for the isolation of the organism from clinical material about 100 c.c. of medium should be inoculated in order not to introduce a large percentage of added nutrients.—U. F. RICHARDSON.

## DISEASES CAUSED BY PROTOZOAN PARASITES

BISHOP, Ann. (1988). *Histomonas meleagridis* in Domestic Fowls (*Gallus gallus*). **Cultivation and Experimental Infection.**—*Parasitology*. 30. 181-194. 20 figs. on 2 plates, 1 table. [Numerous refs.]

Turkeys bred from "sterilized" eggs were fed with bacteria-free cultures of *H.m.* in order to establish that this organism is the cause of "blackhead". Although cultures (Strain CL) were obtained from the liver of a hen and sub-cultured for a year, B. failed to obtain a pure culture. The media used are described. The pH of cultures less than three days old was 7.0-6.5, but fell later. If it was less than 4.0 all the organisms died. The optimum temperature was 36.5°-37°C.; the organisms died rapidly at room temperature or lower temperatures. Strain CL was not markedly virulent for chicks, but infectivity was high, 11 out of 12 chickens being infected, although only caecal lesions were set up. The strain showed great amoeboid activity at 37°C., and normally possessed a hair-like flagellum. In fixed stained preparations the size was 8-19 $\mu$  (average 10-14 $\mu$ ); living forms were larger. The nucleus was spherical or pear-shaped, with a well-defined nuclear membrane and a globular, siderophilic karyosome. A flagellum arose from a single blepharoplast, which was sometimes apposed to the nuclear membrane and otherwise attached to it by two fine rhizoplasts. An extra fibril arising from the blepharoplast and ending in the cytoplasm at the opposite end of the body was sometimes seen. Multiple fibrils as described by TYZZER [(1919). *J. med. Res.* 40. 1.] in tissue sections were not seen. Parasites having 2-4 nuclei, each of the latter with a flagellum, are described; the flagella disappeared during division. No resistant phase was observed in cultures.—C. V. WATKINS.

NIIMI, D. (1988). **Studies on Blackhead. III. Test of Surgical Operation, Immunology and Chemotherapy.**—*J. Jap. Soc. vet. Sci.* 17. 18-57 of pt. 1. 14 tables. [4 refs.] [In Japanese: abst. from English summary pp. 3-5 of pt. 2]. [See also *V. B.* 9. 156].

N. found that eradication of *Heterakis papillosa* controlled blackhead. He now considers other curative and preventative measures of control. Ligation of the caeca at their base [see also *V. B.* 4. 342.] prevented infection, but this stunted the growth of chicks and in addition often proved fatal.

N. deduced from field observations that a "sterile" immunity resulted after recovery from the natural disease. On rare occasions recovered birds became reinfested after an interval of 50-60 days. Artificial immunity could be induced by intraoecal injection of the parasites or by subcutaneous injection of free-living liver parasites. Such immunization was neither very safe nor efficient. Serum from recovered birds could not be proved to contain antibodies.

Many drugs used for various protozoan diseases were tested by broth culture for prophylactic purposes. Trypaflavine, "liverol", trypanblue, "bistran", "neo-Trepol", chinine, "plasmodin", atebirin, "Yatren 105", and Bayer 205 all had no effect. Sodium tartar emetic and ipecacuanha had a slight effect on lesions but not on the course of the disease or mortality. Results were better when both these preparations were used.—C. V. WATKINS.

PAVLOV, P., & GUENEV, C. (1939). Recherches sur un trypanosome (*Trypanosoma evansi* Steel 1885) trouvé dans le sang d'un cheval de la région du Bourgas en Bulgarie. [*Tryp. evansi* in the Blood of a Horse in Bulgaria].—*Ann. Parasit. hum. comp.* 17. 158-161. 2 figs. [16 refs.]

A trypanosome is described from the blood of a 16-year-old horse in Bulgaria which had not been out of the country. It is considered that the organism was *Tryp. evansi* and not *Tryp. equiperdum*, as it was inoculable to a mare with dourine, and also to cattle, sheep, dogs, cats, rabbits and g. pigs. The organism is described as occurring in two forms, one long and slender with a free flagellum, and devoid of a blepharoplast, the other short with no free flagellum. It is thought this discovery may be important as *Tryp. evansi* may be capable of spreading in Europe. [The dimorphism described is not characteristic of *Tryp. evansi*, though that organism has a greater variation than *Tryp. equiperdum*].—U. F. RICHARDSON.

- I. TOPACIO, T., & ACEVEDO, R. A. (1938). A Survey of the Incidence of Surra in Philippine Cattle and Carabaos by Complement Fixation Test. (Preliminary Report).—*Philipp. J. anim. Indust.* 5. 597-604. 2 tables, 1 graph. [3 refs.]
- II. TOPACIO, T. (1938). Studies on Surra. I. The F-N-T.E. [Fouadin-Naganol-Tartar Emetic] Treatment of Native Horses in Experimental Infection. II. The F-N-T.E. Treatment of Native Horses in Natural Infection.—*Ibid.* 605-610.
- II. YUTUC, L. M. (1938). A Report on the First Outbreak of Surra in British North Borneo and Its Control Measure.—*Ibid.* 501-515. 4 figs. on 3 plates, 4 tables, 1 map. [4 refs.]

I. It has been shown by the complement-fixation tests carried out that domesticated water buffaloes are more frequently carriers of *Trypanosoma evansi* infection than cattle. The incidence of infection in 2,624 buffaloes was 19.8%, while of 2,141 cattle only 2.57% were infected. There is no apparent seasonal fluctuation in the infection of either species; illness due to infection occurred in every month of the year. The extension of this survey to cover all the islands by means of the c.-f. test is being continued.

II. T. gives the results of treating (a) 11 experimentally infected and (b) 50 naturally infected native ponies (of 300-500 lbs weight). Six of the first group recovered and 44 of the second group. Six injections at intervals of 5-7 days were given. The first dose consisted of 40 c.c. fouadin injected subcutaneously and 2 g. of a 2% naganol solution intravenously; the second dose was 1 g. of a 1% solution of tartar emetic intravenously; the third dose was 2 g. naganol, the fourth was 1 g. tartar emetic, the fifth 2 g. naganol, and the sixth 1 g. tartar emetic. Fouadin may replace the tartar emetic in any of the doses; this was done with pregnant mares. Subcutaneous injections of camphor in oil were used as a cardiac stimulant when necessary. Tests for a cure included the results of blood inoculation of susceptible small animals, microscopical blood examination, three successive complement-fixation tests at monthly intervals, tests of spinal fluid by animal inoculation, and c.f. tests,

III. Y. reports on an outbreak of *Tryp. evansi* infection which he investigated. He found that 120 of 973 ponies and one of 658 buffaloes were infected; 85 cattle and 5 goats were not infected. He treated the infected animals with 20-30 c.c. of a 10% solution of naganol followed the next day by 50 c.c. of a 2% solution of antimony tartrate. The results are not recorded.—J. A. GRIFFITHS.

CORSON, J. F. (1938). **A Fourth Note on the Infectivity to Man of a Strain of *Trypanosoma rhodesiense*.**—*J. trop. Med. (Hyg.)*. **41**. 262-265. 3 tables. [9 refs.]

C. records further experiments on man to test the infectivity of a strain of *Tryp. rhodesiense* which had been maintained in ruminant animals (sheep and antelopes) since October 1934 by cyclical passages through *Glossina morsitans* [see *V. B.* **4**. 234]. Strains from sheep, a reed buck and an eland were successfully transmitted to man by infected *G.m.* The pathogenicity of the sheep strain to man appeared to be about the same as when tested two years previously. C. concludes that *Tryp. rhodesiense* is a parasite not only of man but also of wild and domestic animals and that it may retain its infectivity for man for several years, or perhaps indefinitely, while living only in animals and tsetse flies. Only one of 30 men infected in the above experiments had failed to show a local swelling where the *G.m.* had fed. C. states that this local swelling, with associated axillary pain, was almost always a definite sign of infection. Trypanosomes appeared in blood from the swelling sometimes two or three days earlier than in blood from the ear lobe.

—J. A. GRIFFITHS.

CORSON, J. F. (1938). **A Third Note on a Strain of *Trypanosoma gambiense* Transmitted by *Glossina morsitans*.**—*Ann. trop. Med. Parasit.* **32**. 245-248. 2 tables. [2 refs.] [See also *V. B.* **9**. 234].

Observations are recorded on a strain of *Tryp. gambiense* after three further passages through *G.m.* There was no evidence that its characters became in any way modified in the direction of *Tryp. rhodesiense*. In the course of direct transmission, a strain isolated from one rat showed increased virulence for rats and g. pigs but not for monkeys. This strain also became less polymorphic, nearly all trypanosomes being slender with a rather short free flagellum.—U. F. R.

KOLODNY, M. H. (1939). **Studies on Age Resistance against Trypanosome Infections: I. The Resistance of Rats of Different Ages to Infection with *Trypanosoma cruzi*.**—*Amer. J. Hyg. Sect. C*. **29**. 13-24. 4 tables. [Numerous refs.]

DUCA, C. J. (1939). **Studies on Age Resistance against Trypanosome Infections: II. The Resistance of Rats of Different Age Groups to *Trypanosoma lewisi*, and the Blood Response of Rats Infected with this Parasite.**—*Ibid.* 25-32. 1 fig., 3 tables. [12 refs.]

CULBERTSON, J. T., & KESSLER, W. R. (1939). **Studies on Age Resistance against Trypanosome Infections: III. Vaccination of Rats against *Trypanosoma lewisi*, with Special Reference to the Response of Different Age Groups.**—*Ibid.* 33-43. 3 tables. [Numerous refs.]

CULBERTSON, J. T. (1939). **Studies on Age Resistance against Trypanosome Infections. IV. The Activity of Germanin (Bayer 205) upon *Trypanosoma equiperdum* Infections in Rats of Different Age Groups.**—*Ibid.* 73-77. 2 tables. [12 refs.]

I. Rats less than 25 days old developed an intense and usually fatal infection when inoculated with 0.006 c.c. per g. body weight of infective suspension, containing 125-150 trypanosomes under high dry magnification (450×), whilst both

males and females of 40-50 days showed a marked resistance which reached its maximum at 75 days, did not decrease thereafter, and which was not related to the presence of any antibody or non-specific factor in the serum. This period closely parallels that of physiological maturation, and may be connected with endocrine function.

II. D. found that when rats of different age groups were injected with 10,000 *Tryp. lewisi* per g. body weight, those of 25 days and under frequently died, whilst those of from 25 days up to 6 months and over showed a marked resistance and mortality was rare. Examination of the blood of animals of both age groups revealed a low erythrocyte count and a secondary anaemia, which was probably a major factor in the cause of death of the very young rats; those that survived showed a marked leucocytosis and an absolute monocytosis. Several monocytes exhibited phagocytosis, but no definite evidence of ingestion of a trypanosome was obtained.

III. Rats were protected against infection with *Tryp. lewisi* by the administration of a formolized homologous antigen. Resistance was more slowly developed in newly born and very young animals than in those 60 days old; the latter group showed a higher agglutination titre after injection of the vaccine than the former, but this titre after recovery from natural infection was somewhat higher than after vaccination. The acquired resistance was maintained for at least three months after vaccination, and appeared to be independent of the leucocytic response.

IV. Rats of different ages were inoculated with a standard dose of *Tryp. equiperdum*, and when the infection had reached a certain level, 10 g. of germanin per 100 g. body weight was injected. In old rats the parasites disappeared from the blood within 15 hours, whilst in young rats they persisted for 30-60 hours. The difference was probably related to variation in the phagocytic capacities of the white cells of rats of the different age groups. Rats with a lighter infection overcame the parasites in less time than did those with a heavy infection. Blood of germanin-treated rats was not infective when injected into normal rats.—M. L. B.

ANDREWS, J., & MILLER, F. W. (1938). Infection with *Trichomonas foetus* in Heifers.—*Amer. J. Hyg.* 27. 285-249. 1 fig., 1 table. [18 refs.]

The reproductive history was followed up and frequent parasitological examinations were made, on 40 heifers with reference to the effects of infection with *Tr.f.* The majority became infected at the first mating with an infective bull; the duration of the infection varied. In most cases there was a decline in clinical severity and a decrease in the number of the parasites; later there was sometimes a spontaneous cure, but a specific resistance appears to follow infection. Prolonged infections were associated with delayed conception, sterility, pyometritis, abortion, and still birth. Infected bulls served cows more successfully than heifers and fewer services were required per cow than per heifer.—M. L. BINGHAM.

I. MAASSEN, H. (1938). Der mikroskopische Nachweis der Rinder-Genital-Trichomonaden (*Trichomonas genitalis bovis*) unter Berücksichtigung der gebräuchlichsten Färbemethoden. [*Microscopic Demonstration of Bovine Trichomonads by Staining Methods*].—*Inaug. Diss., Giessen.* pp. 28. 4 figs. on 4 plates. [Numerous refs.]

II. SÄLZER, H. (1938). Infektionsversuche mit Geschlechtstrichomonaden des Rindes. [*Experimental Infection of Cattle with Genital Trichomonads*].—*Inaug. Diss., Giessen.* pp. 48. [Numerous refs.]

I. The author studied various methods for the detection and morphological study of *Tr. foetus*. He concludes that, to detect the organism in pyometra

material, the examination of fresh unstained material is the most reliable method. The organisms can be readily detected if still moving, and even if they are dead, they can be recognized in unstained material if degeneration has not gone too far. Dark ground illumination gave no advantage over ordinary illumination. Various methods of staining were tried, but were all rather unreliable for detection of infection unless the trichomonads were very numerous, when occasional well stained specimens could be seen. In his hands the most satisfactory staining was given by Hees' method, in which infected material is diluted with buffered saline, allowed to dry, and then stained for 30 minutes with dilute Giemsa. This method of staining was useful for the study of morphology, but, as the material has to be diluted with saline, is unsuitable for detecting infection in material in which the organisms are scanty.

II. S. records investigations on the experimental infection of cattle with *Tr.f.* Before being put on experiment, animals were examined for infection by culture of the blood and of the preputial or vaginal secretion. In two cases animals which were believed to be virgin gave positive cultures both from the blood and from the secretions of the sexual organs.

Bulls were infected by injection of culture into the preputial sac, and in one case by service of an infected cow. Trichomonads were demonstrated by cultural methods in the preputial secretions and, in three cases out of six, in the blood, but in no animals were the parasites detectable by microscopic examination. Attempts to demonstrate transmission of infection to cows by coitus were negative, but in each case the experimental animal had shown a previous trichomonad infection. Cows infected by intravaginal injection of culture or pus from the uterus of cases developed a vaginal infection, detectable microscopically, in periods varying from one to 18 days, and in two cases a blood infection was demonstrated by culture.

Attempts to infect by intravenous inoculation resulted in a temporary blood infection which disappeared in a few days without extension to the sexual organs, and oral administration of cultures or infected material did not result in infection of either the sexual organs or the blood.—U. F. RICHARDSON.

JENSEN, B. H. (1938). Trichomonadeinfektion hos Kvaegget specielt med Henblik paa Lidelsens Betydning som steriliserende Faktor. [**Bovine Trichomoniasis and its Importance as a Cause of Sterility**].—*Maanedsskr. Dyrlaeg.* 50. 225-239. [7 refs.]

Uterine material from a cow with pyometra caused by trichomoniasis was rubbed into the prepuce or vagina of five cows and one bull, and none became infected. Intraperitoneal inoculation of 3 c.c. of the same material into ten pregnant g. pigs caused infection and abortion in only one animal.

J. considers that the trichomonads were of low virulence and that such factors as nutritional deficiencies are important predisposing conditions.

—H. C. BENDIXEN (COPENHAGEN).

SCHOOP, G., & STOLZ, A. (1939). Trichomoniasis bei Rehen. [**Trichomoniasis in Roebeuck**].—*Dtsch. tierärztl. Wschr.* 47. 113-114. 1 fig.

A condition of sterility is described in roebuck in the forests round Kassel in which the does failed to give birth to young for as long as 7 or 8 years. Examination of the uteri of five animals revealed an enlargement of the organs with a thickening of the mucous membrane, and in some cases a muco-purulent secretion. Cultural methods revealed a trichomonad infection in four out of five cases, the organism being similar to the trichomonad of cattle, but slightly smaller.—U. F. R.

SIMITCH, T., & KOSTITCH, D. (1988). Présence de *Trichomonas canistomae* Hegner et Ratcliff chez les chiens de la Serbie du sud. Sa différenciation d'avec *Trichomonas elongata* Steinberg. [*T. canistomae* in Dogs in Southern Serbia].—*Ann. Parasit. hum. comp.* 16. 33-35. [2 refs.]

*T. canistomae* was isolated from the saliva in 23 out of a group of 165 dogs. Three young dogs and three human beings could not be infected experimentally [no details], but three adult dogs were easily infected. It is differentiated from *T. elongata* (a parasite of human beings) on morphological and biological grounds and on the results of experimental cross-infection [no details].—M. L. BINGHAM.

CHRISTENSEN, J. F. (1988). Species Differentiation in the Coccidia from the Domestic Sheep.—*J. Parasit.* 24. 458-467. 9 figs., 1 table. [10 refs.]

Of faecal samples taken at random, 96% contained oocysts, 62% being of two to four species and 34%, pure. The authors conclude that the examination of the oocyst in the faeces of sheep is adequate for species identification, especially of the unsporulated oocyst. The sporulation time is misleading in identification, unless conditions are carefully standardized. A minute description of the oocysts follows, with the method of preparation of samples.

The authors confirm BALOZET's view [V. B. 3. 351.] that there are heretofore only five valid species of *Eimeria* of sheep, viz :—*E. parva*, *E. nina-kohl-yakimovi*, *E. faurei*, *E. arloingi* and *E. intricata*; *E. galouzei* being found within the morphological range of *E. parva* and *E. aemula* among the atypical capless oocysts of *E. arloingi*. Two new species, *E. pallida* and *E. granulosa* are described.—S. F. B.

DEEM, A. W., & THORP, F. J. (1939). Variation in Numbers of Coccidia in Lambs During the Feeding Season.—*Vet. Med.* 34. 46-47. 1 table, 1 chart. [10 refs.]

Faecal examinations were carried out on three lots of lambs fed under good conditions. Each sample was a composite one obtained from 3-4 lambs and four such samples were examined on each occasion. The examinations were carried out at intervals of approximately one week, and the results showed that the numbers of coccidia rose during the first two weeks after the lambs had been brought into the "feedlots", remained stationary for about three weeks, and then declined.

—W. J. IRONSIDE.

MINNING, W. (1936). Zur Entstehung der Kokzidenknotten in der Leber von Kaninchen. [Coccidial Nodules in the Liver of Rabbits].—*Z. Parasitenk.* 9. 61-72. 8 figs. [5 refs.]

M. describes the early stages of coccidiosis in rabbits. He states that the first histological changes occur in the anterior part of the liver, and in the vicinity of the smaller bile ducts and interlobular veins, where lymphocytes appear before the parasites. This is caused by the reaction of the tissue to the migration of the sporozoites. Even when the first few parasites appear, dilatation of the bile duct can be observed, caused by the increase of epithelial cells.

In the later stages of the infection the proliferation of connective tissues corresponds to the picture of interstitial hepatitis.

IVANIĆ, M. (1937). Parazitski razorački rad i množenje multiplom deobom (shizogonijom) jednoga Leucocytozoon-a (*Leucocytozoon galli* spec. nov.) u crvenim krvnim zrnima i unutrašnjim organima domaće kokoši (*Gallus domesticus* L.). [On a New *Leucocytozoon*, *L. galli*, n. sp., Its Parasitic Destructive Action, and Its Multiplication by Schizogony in the Red Blood

**Corpuscles and Internal Organs of the Common Fowl].—***Arhiv Minist. Poljopriv., Belgrade.* 4. No. 9. 3-45. 1 plate. [Numerous refs.] [German summary].

The author describes the life-cycle of a new pathogenic species of *Leucocytozoon* (*L. galli*), and gives details of its multiplication by schizogony in the red blood corpuscles and internal organs (especially in the spleen) of the common fowl.

—B. OSWALD (KRIŽEVCI).

TOUMANOFF, C. (1939). Le paludisme des buffles peut-il fausser les indices oocystiques et sporozoitiques en Indochine? [**Malaria of Buffaloes in Indochina and its Falsification of the Oocyst and Sporozoite Indices in Human Malaria Surveys**].—*Bull. Soc. path. exot.* 32. 80-87. [11 refs.]

Replying to BRUMPT's suggestions [*V. B.* 9. 155.] that oocysts and sporozoites of malaria observed in *Anopheles minimus* appeared to be too immature to be derived from the reputed infective feed, and might be derived from buffaloes on which the insects had fed later, T. points out that it is known that development of malarial parasites in mosquitoes may be delayed by cold. He also points out that in one case the insect in question had been fed on cattle and not on buffaloes. He records other cases in which sporozoites and young sporocysts had been detected up to 17 days after the infecting feed, and also points out that *A. minimus* feeds almost entirely on human blood, whilst other species of mosquitoes which feed largely on buffaloes have not shown a malarial infection. He suggests that other factors, besides cold, may retard the development in the mosquitoes, and that one of these factors may be the species of animal on which the insects are afterwards fed.—U. F. RICHARDSON.

RAO, M. A. N. (1938). **A Note on *Plasmodium bubalis* Sheather, 1919.**—*Indian J. vet. Sci.* 8. 387-399. 1 plate. [2 refs.]

R. describes the schizogony of *Pl.b.* with the aid of a schematic diagram. All the forms described occurred in the blood of 11 buffaloes at the Madras Serum Institute in 1936. One animal showed haemoglobinuria and a rise of temperature for one day when the parasites were present in blood smears. R. describes three stages of the plasmodium, which grows in the erythrocytes of the buffalo, *viz.*, (1) young ring forms (merozoites which have entered the erythrocytes), (2) trophozoites developing into schizonts, and (3) gametocytes. The young ring forms measured  $1.5-2\mu$ , the trophozoites from  $2.5-3.5\mu$  up to  $5-6\mu$  when fully grown; what is presumed to be the female gametocyte was about  $6\mu$  in diameter. R. suggests that *Pl.b.* is a cryptic protozoon infection of buffaloes, *i.e.*, it shows itself in the presence of an intercurrent disease, such as rinderpest, or when vitality is lowered, as by bleeding for serum production.—J. A. GRIFFITHS.

SIMONS, H. (1939). Sur les rapports des plasmodies paludiques et des piroplasmes avec les réticulocytes. [**The Relationship between Malarial Parasites and Piroplasmas and the Reticulocytes**].—*Ann. Parasit. hum. comp.* 17. 72-85. [Numerous refs.]

The reticulocytes are defined as immature red cells containing a granulo-filamentous substance, and in normal human blood vary from about 0.5 to 1% of the corpuscles. In canine blood and the blood of calves, a small number also occur, but they are said to be absent from the blood of adult cattle. Considerable difference of opinion exists amongst various authors as to how far malaria parasites have a predilection for reticulocytes, some authors saying that 95% of these cells may be invaded, and others not being able to detect any selective action on the

part of the parasites. It is suggested that the only true criterion is to estimate the percentage of the available parasites which invade the reticulocytes, and calculations on this basis show there is no selective tendency towards these cells. It is emphasized that moist staining should be adopted; *S.* uses methylene blue and saponin. Staining of dry smears with Giemsa or other double stains may give unreliable results.

*S.* was able to examine the blood of dogs infected with *Babesia canis* and *B. gibsoni* and a bull with a double infection with *B. bigemina* and *B. argentina*. The babesia did not invade the reticulocytes, though it was noticed that in the dog 22.6% of these cells occurred, and that in the bull 0.5% were present although the animal was an adult.—U. F. RICHARDSON.

CERRUTI, C. G. (1939). Recherches sur les piroplasmose du porc. [*Piroplasmoses in Swine*].—*Ann. Parasit. hum. comp.* 17. 114-186. 4 text figs., 10 figs. on 8 plates. [Numerous refs.]

Piroplasmosis of the pig has been described as occurring in Russia, Africa and Italy. The piroplasms conform with the description of *P. trautmanii* reported by TRAUTMAN from an outbreak in East Africa [(1921). MENSE. *Handbuch der Tropenkrankheiten*. 6. 409. Leipzig: J. A. Barth]. The disease is common in Sardinia, in which country the present study was made. The symptoms include fever, haemoglobinuria, jaundice and anaemia. The incubation period is not known. Severe blood changes are observed microscopically; the leucocyte formula is much altered, with increase of large mononuclear and transitional neutrophile cells. The attack lasts for 7-8 days, and is fatal in untreated cases. A less severe form also occurs, chiefly in young pigs. P.M. appearances of liver, spleen, heart, kidney and lymph nodes are described in detail.

The piroplasm is seen in round or ring forms, and is rarely oval; pear-shaped and amoeboid forms also occur; 1-4 parasites may occur in a single corpuscle, and some 60% of corpuscles may be invaded.

Another type of piroplasm was also encountered, and the name *Babesiella peroncitoi* is provisionally given to this organism, which is much smaller and occurs in various shapes: 2-4 may invade the corpuscles, of which some 10% may be infected, and free forms also occur; round forms are observed in 70% of types. Anaplasma-like bodies were frequently observed in benign cases of piroplasmosis, but it is not possible to decide on their nature until inoculation experiments have been performed.

*Rhipicephalus sanguineus*, *Hyalomma aegyptium* and *Dermacentor reticulatus* were found on pigs with piroplasmosis, and it is intended accurately to establish the vector by experiments. Acaprin gave very good results in the treatment of both types of piroplasmosis.—S. J. GILBERT.

WOLFSON, F. (1937). Experimental Transmission of *Toxoplasma* in Canaries. —Copied *verbatim* from *J. Parasit.* 23. 353.

An infection of *Toxoplasma* was discovered in May, 1937, in a canary which was kept in the laboratory for about 2 weeks, and was injected with sporozoites of *Plasmodium cathemerium* 11 days previous to its death. Various stages of *Toxoplasma* were observed in the circulating blood and in the internal organs, including the liver, spleen, lungs, kidneys, and bone marrow. The infection was transmitted to 13 canaries, to 5 from the original bird, and to the other 8 by a series of five subinoculations. Successful transfers were accomplished by intramuscular, intraperitoneal or intravenous injection of blood, bone marrow or brain tissue taken from dead birds. In nine cases the injections were performed within

one hour after the death of the bird; in the other four cases they were done from 12-24 hours after death. One attempt to use the material from a bird dead more than 24 hours proved unsuccessful. The diagnosis of infection with *Toxoplasma* was in two cases by the examination of blood films, and in all cases by the study of tissue preparations stained with Giemsa. In addition to *Toxoplasma*, the experimental canaries carried plasmodial infections. All canaries died from 5 to 14 days after being injected with *Toxoplasma*. Since malaria seldom kills canaries in such a short period, the death of the birds was evidently due to the *Toxoplasma*. Autopsies always showed a typical pathology. Birds injected at the same time usually died on the same day. Three control canaries kept in cages with the birds carrying *Toxoplasma*, showed no infection.

SPENA, A. (1939). Sull'anaplasmosi dei bovini indigeni (bos indicus) del basso-piano occidentale Eritreo. [*Anaplasmosis in the Indigenous Cattle of the Western Plains of Eritrea*.—*Azione vet.* 8. 129. 1 fig.]

S. describes the finding of *Anaplasma marginale* in the R.B.C. of cattle brought to the Asmara market, Eritrea, to be slaughtered. Most of them seemed very fatigued after their journey, but soon recovered. A few showed more marked symptoms, such as anorexia, loss of rumination, fever, slight icterus and dyspnoea, but apart from taking blood samples from 100 of the animals S. could not follow their subsequent history. He concludes that the infection became apparent after the lowering of their natural resistance as a result of their journey.

I. NEITZ, W. O., & THOMAS, A. D. (1938). *Rickettsiosis in the Dog*.—*J.S. Afr. vet. med. Ass.* 9. 166-174. 34 figs. [6 refs.]

II. LAWRENCE, D. A. (1938). *Rickettsiosis in a Dog*.—*Ibid.* 175-178. 2 figs. [2 refs.]

I. A fatal disease of domestic and wild dogs which occurs in the southern portion of the Kruger National Park is described. The almost complete disappearance of the wild dog (*Lycaon pictus*) from the Park may be attributable to this disease. The cause is a *Rickettsia* (*R. canis*), which is present in the monocytes and neutrophils. A jackal inoculated with infected blood became a carrier but showed no symptoms. The symptoms in dogs are a febrile reaction lasting three to four weeks with progressive anaemia and emaciation. No observations could be made on immunity as all the dogs in the experiment died. Drugs such as trypan blue and acaprin have no effect on the course of the disease. The only preventive measure is to keep dogs free from ticks.

II. A case of rickettsiasis in an old English Setter dog is described. The animal had been treated for biliary fever but continued to show a pronounced anaemia. Clumps of rickettsia organisms were found in the monocytes in a blood smear after a prolonged search for *Piroplasma canis*. Treatment with "akiron" was carried out and the dog eventually recovered. L. considers the *rickettsia* in this dog to be similar to the one described under the name of *R. canis* by DONATIEN and LESTOQUARD in Algiers in 1935 [*V. B.* 6. 225].—E. M. ROBINSON.

BESSEMANS, A., WITTERBOLLE, P., & DE BORCHGRAVE, O. (1938). Leptospiroses canicole et ictero-hémorragique en Belgique.—[*Leptospira canicola* and *L. icterohaemorrhagiae* Infections in Belgium].—*C. R. Soc. Biol. Paris.* 129. 906-908. [Numerous refs.]

*L. canicola* and *L. icterohaemorrhagiae* are apparently rare in dogs in Belgium, although more than 81% of sewer rats are infected with the latter organism. Tests were made on 86 dogs, of which 6 had nephritis and one jaundice; no

spirochaetes were seen in the urine: serological tests on 68 of the dogs were also negative, but the serum of the icteric dog lysed *L. canicola* at a dilution of 1:500 and 8 days later at a dilution of 1:5000. Cultures could not be grown from blood or urine. Only a few cases of Weil's disease in human beings have been recorded on Belgium; out of 358 samples of serum for the Wassermann test, one lysed *L. canicola* at a dilution of 1:200, and another lysed *L. icterohaemorrhagiae* at a 1:500 dilution.—M. L. BINGHAM.

## DISEASES CAUSED BY VIRUSES

- (1938). **Virus Diseases of Animals—General Discussion.** [Speakers: WATSON, E. A., ANDREWES, C. H., DAUBNEY, R., ALEXANDER, R. A., HENRY, M., OLVER, A., & DATTA, S. C. A.]—*Rep. 1st. Imp. vet. Conf. Lond., 1938.* 42-44. Weybridge: Imperial Bureau of Animal Health. [5s.]

Dr WATSON emphasized the increased importance of virus diseases. Fundamental research on the true nature of viruses is essential. An important development was the discovery that certain viruses can multiply greatly in the living chicken embryo. In equine encephalomyelitis the immunity derived from the inoculation of the chicken embryo virus is superior to that obtained from a vaccine-virus from the brains of infected horses.

Dr C. H. ANDREWES observed that the relative immunizing values of inactive killed virus and modified active virus must be given full consideration. Certain inactivated viruses make good vaccines only when they are inoculated into an animal of similar species to that from which the vaccine was originally obtained; this was found to be the case with the human influenza virus. Probably the inoculated animal reacts to the large quantity of foreign animal protein before antibody production against the virus is commenced; with a living vaccine this does not occur, as the virus multiplies rapidly in the inoculated host.

Mr DAUBNEY stated that in a part of Kenya the incidence of rinderpest had been greatly reduced by the use of inactivated vaccine. The vaccine is more effective if divided into two or three doses given at intervals. The attenuated rinderpest goat-virus had not been so successful in Africa as in India.

Mr ALEXANDER stated that the chemotherapeutic treatment of virus diseases was valueless. The possibility of a modified attenuated virus changing back into its virulent form should always be considered.

Mr MAX HENRY stated that swine fever immunization had been prohibited in Australia for 80 years. The importation of meat was not allowed from countries infected with F. & M. disease.

Col. Sir ARTHUR OLVER stated that the goat-virus vaccine had been found to be of great benefit in India; the immunity conferred appeared to be of at least five years' duration. For cattle of imported European breeds the goat-virus vaccine was dangerous, and the serum-simultaneous vaccine was to be recommended.

—E. C. HULSE.

- (1938). **A Discussion on New Aspects of Virus Disease.** [Speakers: SALAMAN, R. N., SMITH, K. M., MACCLEMENT, W. D., BAWDEN, F. C., BERNAL, J. D., McFARLANE, A. S., FINDLAY, G. M., WATSON, M. A., MURPHY, P. A., & ELFORD, W. J.]—*Proc. roy. Soc. Ser. B.* 125. 291-310. [Numerous refs.]

SALAMAN, who opened this discussion, described six distinct strains of X-potato virus which could be differentiated by their reactions on potato or tobacco plants. The antigenic composition of these strains, the course of mutation and the protective value of weak strains against highly virulent strains were discussed.

SMITH and MACCLEMENT referred to the ultrafiltration of plant viruses. The small and medium sized viruses ( $18\text{-}20\mu$  and  $100\text{-}110\mu$ , respectively) passed through membranes fairly easily, but the large particle viruses ( $400\text{-}700\mu$ ) did not readily filter. This is probably due to the low virus content of the sap. Attempts at concentrating these viruses led to loss of filtrability. The actual diameter of the particle size was also difficult to determine, owing to wide variations encountered according to the substrate in which the viruses were found.

BAWDEN discussed the crystalline and liquid crystalline states and described experiments on the concentration and purification of plant viruses by high-speed centrifugation.

BERNAL drew attention to the resolution of plant viruses by X-rays, and showed how the intramolecular pattern could be used to differentiate certain strains, *e.g.* tobacco virus. X-ray classification seemed to confirm the results obtained by serological and clinical observations.

McFARLANE described experiments on the ultra-centrifugation of virus particles in different substrates with the object of determining the nature of their structure. His observations were amplified and criticized by ELFORD.

FINDLAY reviewed the methods adopted in recent years to produce mutation in viruses, while WATSON described experiments on the transmission of certain plant viruses by the aphid with particular reference to the effects of increasing infectivity by fasting the insects and to the influence of insect digestive enzymes on the plant viruses.

MURPHY considered the control of potato virus disease either by raising disease-free stocks or by protective inoculation with weak viruses.

[Readers are referred to a similar discussion at the Royal Society of Medicine—*V. B.* 9. 80].—R. E. GLOVER.

NICOLAU, S. (1938). La para-immunité (résistance non spécifique acquise) dans les maladies à ultravirus. [**Non-Specific Resistance to Virus Diseases**].—*Rev. Immunol.* 4. 263-286. [Numerous refs.]

In this review N. discusses heterologous immunity arising during the course of various infections, as exemplified by the presence of antibodies against one virus in animals immunized against another, *e.g.*, vaccinia and herpes, Aujeszky's disease virus and virus B, etc. It is suggested that the phenomenon may be due, in some instances, to previous inapparent infections (herpes) and in others to a purely non-specific increase in resistance, *e.g.*, poliomyelitis and Born disease, pantropic Rift Valley fever virus and pantropic yellow fever virus, etc. In the last mentioned cases increase in resistance is probably of a cellular nature and comparable to that induced by various physical and chemical agents, *e.g.*, X-rays, Indian ink, tannic acid, sulphate of zinc, etc. It is pointed out that the immunity to heterologous agents is always on a much lower plane than to the homologous substances.

The complement-fixation reaction is considered to be unreliable in certain virus diseases, since non-specific fixation is often produced with viruses which are closely related.—R. E. GLOVER.

- (1938). **Discussion on Foot and Mouth Disease**. [Speakers: CABOT, D. A. E., ANDREWS, W. H., DAUBNEY, R., DU TOIT, P. J., PURCHASE, H. S., LAIDLAW, P., NORRIS, J. H., BEVAN, L. E. W., & OLVER, A.]—*Rep. 1st Imp. vet. Conf. Lond., 1938*. pp. 94-99. [6 refs.] Weybridge: Imperial Bureau of Animal Health. [5s.]

Mr CABOT gave an account of the means by which F. & M. disease virus is introduced into Great Britain. The possibility of virus being imported on food

stuffs was considered ; it is unlikely that the virus on the grain survives in oil-cake, owing to the high temperature employed in its preparation. In 1926, an outbreak in cattle on a sewage farm was traced to the drainage emanating from a bacon factory where diseased pig carcasses had been imported from the Continent. This led to an embargo on meat from the Continent and at the same time considerable reorganization of meat inspection methods was carried out by the South American Republics.

During the winter of 1938, 260 outbreaks occurred in the Eastern and Southern counties ; these outbreaks appeared to coincide with the immigration of starlings from infected European countries. The theory that starlings may act as mechanical carriers of the virus received considerable support during this outbreak. One outbreak was traced to the injection of a cow with infected anterior pituitary extract manufactured on the Continent.

Dr ANDREWS referred to the establishment of a pneumotropic strain of the virus in hedgehogs. The use of hyperimmune serum minimized the effects of the virus but on direct exposure to infection small lesions were likely to develop ; formolized vaccines could not be recommended.

Mr DAUBNEY stated that field strains of virus isolated from cattle were liable to mutation during g. pig adaption ; the drawing of conclusions about type strains from g. pig experiments should be treated with considerable reserve.

Dr DU TOIT stated that in a country free from disease active immunization should be very carefully considered before being attempted, owing to the danger that the virus might be spread. He suggested that research work on F. & M. disease should be considerably expanded in Great Britain ; in particular, experimental work should be performed on cattle rather than on g. pigs.

Mr NORRIS stated that in Ireland very strict importation laws were imposed ; no biological products were admitted from infected countries.—E. C. HULSE.

KANAUKA, K. (1938). Baltijos valstybiu konferencija priemonems kovai su snukio ir nagu liga apsvastyti. [*Baltic States (Latvia, Lithuania, Estonia) Conference to Consider Means for Combating Foot and Mouth Disease*].—*Vet. ir Zootech., Kovno*. 15. 33-37.

According to the report on the precautionary measures employed in all three countries, the following decisions were made :—

Transport of living animals and of raw materials into and through the country from countries infected with F. & M. disease was to be forbidden, and from unaffected countries it was to be allowed only after general precautionary measures had been taken. Imported raw products were to be sent direct to the factories. All transport vehicles were to be disinfected with 1-2% NaOH. An outbreak in any one of the Baltic States was to be immediately reported by telegraph to the State veterinary authorities of the other two. All cattle, sheep, goats, swine, dogs, cats and birds on the farms where the outbreak originated were to be immediately destroyed. If the disease had already spread in the district it was to be controlled by quarantine measures.—A. PABIJANSKAS (KAUNAS).

I. BELLER, K. (1938). Zur Epidemiologie der Maul- und Klauenseuche. [*Epidemiology of Foot and Mouth Disease*].—*Münch. tierärztl. Wschr.* 89. 4-7. 3 figs., 1 table. [14 refs.]

II. HIRSCHFELDER, H. S., & WOLF, J. (1938). Die Bedeutung von Insekten und Zecken für die Epidemiologie der Maul- und Klauenseuche. [*The Importance of Insects and Ticks in the Epidemiology of F. & M. Disease*].—*Z. hyg. Zool. Schädlbekämpf.* 30. 142-147. [18 refs.]

I. In discussing the epidemiology of F. & M. disease, B. points out that when an exceptional epizootic occurs it is often assumed that it represents infection with a new virus type, but that the recent outbreaks in Germany have been proved to be due to the recognized type A virus. He points out that statistics show that the virulence and the infectivity of F. & M. disease are not correlated characteristics, and that many of the most wide-spread outbreaks have been the mildest, but that sometimes the virulence varies enormously in neighbouring districts. It has been suggested that the recent serious spread in Germany was due to shortage of food-stuffs, but the evidence points to a decrease in susceptibility with a decrease in the standard of nutrition. It appears that seasonal and regional factors influence the course of the disease, but possibly these influence the host rather than the virus. The tendency for more severe epizootics to recur at intervals of 4-5 years is thought to depend mainly on the immunity of the animal population, and it is pointed out that English work [V. B. 8. 129.] has shown that immunity to one virus type lasts 32-52 months.

The influence of other susceptible species requires further study, but it is pointed out that spread is almost entirely due to animal contacts, or to carriage of infection by human beings.

II. The authors review the literature dealing with the importance of flies and ticks in the transmission of F. & M. disease, and point out that in the case of non-biting flies all attempts to produce infection by these insects have failed, although the conditions of experiments have been much more favourable for transmission than those encountered naturally. It is doubtful whether these flies could carry sufficient virus to produce infection, and it is also noticeable that the prevalence of F. & M. disease is not correlated with that of these flies.

The cattle on the Island of Riems did not contract accidental infection, though the prevailing wind would carry flies from the mainland, which is only 800-1,500 m. away. Again, grasshoppers moving from an affected farm failed to infect pigs which ate them. As regards biting flies (*Stomoxys* and *Tabanus*), attempts at experimental transmission gave negative results, although it was shown that virus can survive in the intestines of these flies for 48 hours.

Virus can be detected for 30 days in the tick *Argas persicus* after an infective feed, and *Boophilus annulatus* has been blamed for the maintenance of F. & M. disease in certain areas in America, but again attempts to transmit infection by means of these ticks have failed, as have attempts to show that the virus might be passed through the eggs in the case of *B.a.*, and through a moult in the case of *Ixodes ricinus*.—U. F. RICHARDSON.

- I. ANON. (1987). Uebertragung der Maul- und Klauenseuche durch Schalenwild. [Transmission of F. & M. Disease by Deer].—*Dtsch. tierärztl. Wschr.* 45. 822.
- II. WALDMANN, O., & HIRSCHFELDER, H. (1988). Die epizootische Bedeutung der Ratten, des Wildes, der Vögel und der Insekten für die Verbreitung der Maul- und Klauenseuche. [The Importance of Rats, Wild Animals, Birds and Insects in the Transmission of Foot and Mouth Disease].—*Berl. tierärztl. Wschr.* April 22nd. 229-234. [Numerous refs.]
- III. ROSENHAUPT, H. (1988). Verbreiten Ratten Maul- und Klauenseuche? [Rats as Possible Spreaders of F. & M. Disease].—*Berl. Münch. tierärztl. Wschr.* Aug. 5th. 470-471.
- IV. STROH. (1988). Maul- und Klauenseuche und das Wild. [F. & M. Disease in Game].—*Münch. tierärztl. Wschr.* 89. 229-231.

V. ANON. (1938). Schalenwild und Maul- u. Klauenseuche (M.u.KS). [**The Role of Deer in the Spread of F. & M. Disease**].—*Berl. Münch. tierärztl. Wschr.* Aug. 5th. 471.

I. Strict regulations in Oldenburg and Ammerland enforce the inspection by veterinary surgeons of all game brought in by hunters, but so far not a single case of infection of the animals with F. & M. disease has been established. It is concluded, therefore, that infection of roe deer with the disease is exceptional, and that the animal is not likely to play any significant part in the transmission of the infection to cattle. Experiments in this district are being continued with a view to settling this question.

II. From a survey of investigations in different countries, and more especially in Great Britain, the authors conclude that very little, if any, importance is to be attached to the agency of rats, other wild animals, birds and insects in the distribution of F. & M. disease in European countries. In regions where the disease is very prevalent, the rat may occasionally serve as a mechanical vector of the virus, but its disinclination to wander any distance from its nesting centres, and the absence of observations of recent considerable migrations from one locality to another makes it unlikely that rats carry the infection far afield. Reports of the occurrence of F. & M. disease in wild game in European countries have been shown repeatedly to lack scientific confirmation. Artificial infection of birds can be induced only with considerable difficulty, so that natural infection is not likely to occur. Birds might perhaps transfer the virus mechanically for short distances, but transportation for considerable distances by migratory birds is out of the question. The same also applies to insects, especially the house-fly. In the authors' opinion, the disease is mainly spread by man.

III. R. disagrees with WALDMANN and HIRSCHFELDER's contention [see II, above] that, owing to a disinclination to wander far afield from its breeding centres, the rat does not play an important part in the distribution of F. & M. disease. His own observations indicate that rats frequently cover distances of several kilometres in a single night, as shown by their tracks in the snow, and that they even cross broad streams of water. He suspects that rats commonly visit neighbouring farms, and that they may well serve as vectors of the infection.

IV. S. states that investigation by veterinarians into the reports from local police officers and cattle owners in various parts of Germany, attributing the death of roe deer and other game to F. & M. disease, has shown that the death of these animals was due to other causes. With reference to the few cases where game kept in captivity were successfully infected artificially, he states that the susceptibility to infection of these animals is not comparable with that of farm stock. In his view, game does not play any significant part in the distribution of F. & M. disease in European countries; he considers it to be mainly spread by man.

V. From a brief survey of the investigations recently carried out by STROH [see IV, above], and by WALDMANN and HIRSCHFELDER [see II, above], and other workers, into the reports recording the occurrence of F. & M. disease in roe deer and other wild game in various localities in Germany, it is concluded that while these animals may occasionally be infected by this disease, they do not play any important part in its transference to domestic animals in Germany.

KRAUSE, C. (1938). Zur böartigen Form der Maul- und Klauenseuche und ihren morphologischen Grundlagen. [**The Malignant Form of Foot and Mouth Disease**].—*Münch. tierärztl. Wschr.* 89. 2-4. [9 refs.]

A general description, with quotations from the literature, of three forms of

F. & M. disease :—benign dermo-stomatitis, the intermediate toxic form with more severe illness, and the so-called malignant form with heart and skeletal muscle changes superimposed on the foot and mouth lesions.—J. E.

CARMICHAEL, J. (1938). **Rinderpest in African Game.**—*J. comp. Path.* **51**. 264-268. [9 refs.]

Reference is made to previous reports of rinderpest in African game and of the varying degrees of susceptibility to the disease of different species.

The buffalo is recognized as the most important wild animal disseminator of rinderpest in Uganda, but field observations indicate that the virus loses some virulence by passage through it. Apparently waterbuck (*Kobus ellipsiprimus* and *K. defassa*) are rarely infected naturally, but have proved susceptible to artificial inoculation. Natural outbreaks in cob (*K. thomsa*) have been recorded, but this animal would appear to have a high natural resistance. Sitatunga (*Tragephalus spekei*) and bushbuck (*T. sylvaticus*) are highly susceptible. Reedbuck (*Redunca spp.*) (*Cervicapra spp.*) and oribi (*Rhaphiceros spp.*) are usually considered highly resistant in their natural state, but acute attacks of the disease among laboratory animals are described.

Eland (*Taurotragus sp.*) are very susceptible and are an important means of spreading the disease owing to their living in close contact with cattle and to their habit of covering long distances.

The pig (*Potamochoerus spp.*, *Phacochoerus spp.* and *Hylochoerus spp.*) is highly susceptible and is a source of danger to other animals owing to its ubiquitous distribution. There would appear, however, to be a fall in virulence of the virus after passage through the pig.—F. J. ANDREWS.

PURCHASE, H. S. (1939). **Vaccination against Contagious Bovine Pleuro-Pneumonia with "Culture-Virus".**—*Vet. Rec.* **51**. 31-47 and 67-75. 12 figs., 27 tables, 1 chart. [Numerous refs.]

P. gives his experience in Barotseland, Northern Rhodesia, when investigating the possibility of controlling the disease by the use of Kenya culture virus. He found that the 11th to the 45th generations were harmless to Barotse and Mashukulumbwe cattle of all ages. Reactions to inoculations were mild and occurred more often in Barotse cattle (there were glandular swellings in 40% of Barotse cattle inoculated and slight temperature reactions in young animals of both breeds). Barotse cattle are said to have been readily immunized, but only 30-60% of Mashukulumbwe cattle could be successfully immunized. An increased dose of vaccine, within limits, is thought to immunize an animal sooner, and it also reduces the number of injections considered necessary from three to two. P. recommends two doses of culture virus at 21 days' interval, with a first dose of 2 c.c. for adults, and 1 c.c. for calves, and a second dose of 5 c.c. and 3 c.c. respectively. Massive doses of culture virus are said to be as safe as the moderate doses usually given. Culture virus can be successfully stored for a month under field conditions in a kerosene-operated refrigerator. No "lunger" was found to harbour virus when lesions were fully organized nor where the sequestrum had been completely liquefied. P. considers that the longer a "lunger" survives, the less is the danger of it acting as a "carrier" of the disease. Virus was demonstrated in five cows four months after clinical recovery from the disease, but in only one of four animals six months after clinical recovery. According to P. it has been suggested that, as a result of passage by subcutaneous inoculation, there was partial loss of virulence, but that virulence was restored if the virus was passed through an animal which had received vaccine but had not yet acquired immunity. He suggests the animals were hypersusceptible at this negative stage in the development of immunity.

The method of vaccination with culture virus was applied under field conditions. This method of attempting to control the disease has been extensively employed in the Sudan and Nigeria, and also used in Kenya and the Gold Coast with fairly satisfactory results. In Tanganyika the results were not so favourably reported on. P. states that the use of N.A.B. as recommended by CURASSON [(1929). *Bull. Acad. vét. Fr.* 2. 300.] has been found valueless when symptoms have been observed in the animals for more than one day. BENNETT's statement [(1932). *J. comp. Path.* 14. 257.] is quoted on culture vaccine—"the immunity produced is of considerable duration"—and also the fact that local tests had shown it to last two years. [Nigerian results 1981 to 1988 show an immunity of very short duration which takes at least three weeks to acquire. The value of this method of immunization in Nigeria has proved doubtful when the disease has once appeared in a herd].—J. A. GRIFFITHS.

- I. ANON. (1938). **You Can Prevent "Sleeping Sickness" from Affecting Your Horses and Mules.** p. 1. Chicago: Horse and Mule Association of America. [4to].
- II. ANON. (1938). **Prevent Sleeping Sickness in Horses.** p. 1. Chicago: Horse and Mule Association of America. [4to].
- III. ANON. (1938). **Redouble your Efforts to Prevent Sleeping Sickness.** pp. 3. Chicago: Horse and Mule Association of America. [4to] [Mimeographed].
- IV. ANON. (1938). **"Sleeping Sickness" [Equine Encephalomyelitis] in the Middle West.**—*Science*. 88. Sept. 16th. p. 9 of Suppl.
- V. SCHOENING, H. W. (1938). **Control of Equine Encephalomyelitis (Sleeping Sickness).**—*Leaflet. Horse and Mule Ass. Amer.* No. 284. pp. 32.
- VI. ANON. (1938). **Present Status Horses and Mules [Equine Encephalomyelitis].** pp. 4. Chicago: Horse and Mule Association of America. [4to] [Mimeographed].

I-III. These notices urge the wide-spread adoption of preventive measures against summer epizootics of equine encephalomyelitis in the U.S.A. The first essential is to protect the animals against the mosquitoes and biting flies which are the carriers of the disease. Work horses should be sprayed with insect repellent, kept in screened stables, and fed "green hay". Pastured horses and mules should be brushed over once or twice a week with a suitable fly-repellent mixture.

IV. A summer epizootic of equine encephalomyelitis, referred to as "sleeping sickness", occurred in three middle western states, with 33,000 deaths. Infection was transmitted by five species of mosquitoes and probably also by biting flies.

V. A general address on the measures to be taken to control the disease. Vaccination is mentioned. Referring to the source of virus infection, S. points out that many birds are susceptible to the virus and suggests that migratory birds may act as hosts. Projected eradication methods are also discussed.

VI. The non-virus type of equine encephalomyelitis, due to "forage poisoning", may be avoided by strict attention to diet. In areas where the virus infection has appeared in the last ten years 25% of the animals have been affected. This notice urges the adoption of control measures and the prompt treatment of infected horses. Hygienic precautions and careful nursing are advocated.

- I. DELAGE, B. (1938). Le système liprotéidique du sérum au cours de l'anémie infectieuse et de la dourine chez les équidés. [The Serum Lipoids and Proteins in Equine Infectious Anaemia and Dourine in Horses].—*C. R. Soc. Biol. Paris*. 128. 985-986. [5 refs.]

II. WITTFOGEL, H. (1938). Ueber den Cholesteringehalt des Blutserums mit ansteckender Blutarmut behafteter Pferde. [**The Cholesterin Content of the Blood Serum of Horses Affected with E.I.A.**].—*Z. InfektKr. Haustiere*. 54. 135-142. 4 tables. [16 refs.]

I. D. found that in horses and donkeys with typical symptoms of E.I.A. or dourine, the extractable lipid : protein ratio in the blood serum was markedly below normal ; the decrease corresponded with that established by him in certain other pathological conditions in animals, and constitutes, in his opinion, an important characteristic of a " state of serious disease ".

II. From the tests described W. concludes that the cholesterin content of blood serum is not significant for the diagnosis of E.I.A. in horses, since it was found to fluctuate within very nearly identical limits in both healthy and infected animals. A slight but not significant increase was observed in febrile attacks following inoculation with the virus.

FORTNER, J. (1938). Der Stand der Erkenntnisse über die ansteckende Blutarmut der Einhufer. [**Present State of Knowledge on Equine Infectious Anaemia**].—*Berl. Münch. tierärztl. Wschr.* Dec. 9th. 751-752. [Also appeared in *Dtsch. tierärztl. Wschr.* 47. 49].

The virus is present in all the organs of infected animals, and it is disseminated in the faeces, urine, and milk. While the resistance of the virus to inactivation is very considerable, recent work has shown that 0.5% phenol inactivates it after three months at 14°-15°C.; a law has therefore been enacted in Germany, decreeing that E.I.A. sera prepared with 0.5% phenol must be stored for at least three months before use. Recent research tends to implicate biting insects (tabanids) in the spread of the infection. The virus has been found to persist in the blood of horses for as long as 14 years after clinical recovery ; such carriers are immune to reinfection. No effective cure of the disease has yet been found.

Accurate diagnosis of E.I.A. requires that the suspected animals should be kept under close observation for weeks or even months, their temperature being taken twice daily ; in the study of the blood, the sedimentation rate is of value, a sedimentation of 50% in 15 minutes indicating infection ; valuable information may also be obtained by cross-inoculations with the sera of the horses under observation. In briefly reviewing the measures prescribed in the different provinces of Germany for the control of this disease, F. considers that all outbreaks should be made notifiable, and advocates stricter quarantine measures and the destruction of latent carriers of the virus.

MEYER, H. (1938). Haben sich die vom Oberkommando des Heeres am 21.12.1936 zur Bekämpfung der ansteckenden Blutarmut der Pferde erlassenen Bestimmungen als ausreichen zur Tilgung der Seuche innerhalb der Wehrmacht erwiesen ? [**The Efficacy of the Measures Taken to Eradicate Equine Infectious Anaemia in the German Army**].—*Z. Veterinärk.* 50. 386-404 and 439-450. [Numerous refs.]

Since the issue at the end of 1936 of orders for the control of E.I.A. in the German army, observations have shown that the disease is mostly present now in a chronic or latent form in army horses, the infected animals hardly showing any signs at all of infection. Observations during life and autopsy of 29 army horses which had died of E.I.A. before the present régime was started, confirmed the value of erythrocyte sedimentation tests in diagnosis. Useful information may also be obtained from liver puncture. One difficulty in controlling E.I.A. is its introduction by remounts purchased in affected areas.

- I. CILLI, V. (1938). Studio di un focolaio di anemia infettiva dell'asino in Eritrea. (Considerazioni patogenetiche con le anemie perniciose dell'uomo). [*Equine Infectious Anaemia in Donkeys in Eritrea*].—*Nuova Vet.* 16. 179-226. 37 figs. on 8 plates, 9 tables, 4 charts, 13 graphs.
- II. MARCATO, A. (1938). Studio anatomo-isto-patologico su di un focolaio di anemia infettiva dell'asino in Eritrea. [*Histopathological Study of an Outbreak of E.I.A. in Donkeys in Eritrea*].—*Ibid.* 227-239. 5 plates.

I. An outbreak of infectious anaemia occurred in a herd of 1,300 donkeys in Eritrea, some of which had come from the Anglo-Egyptian Sudan and some from Cyprus. Prior to the arrival of the donkeys, none of the horses or mules with which they were subsequently in contact had shown signs of the infection. Under experimental conditions the infection was reproduced in donkeys by various methods, e.g. subcutaneous or intravenous injection of serum of affected animals, or by contact with infected animals. Of 14 donkeys experimentally infected two had acute, seven sub-acute, and five chronic infections. Horses and mules did not seem to be very susceptible to the virus, but donkeys seemed to be very susceptible to experimental infection.

Haematological observations gave results as in infected horses. The coagulation of the blood was delayed and the volumetric index was reduced from 30 to 22. The normal ratio of red blood cells, white blood cells and plasma was changed from 1.09 : 0.04 : 2.19 to 1.21 : 0.04 : 3.74, with a reduction of the erythrocyte column in favour of the plasma column. The serum was thick and dark yellow and the van den Bergh reaction was negative. The refractometric index was reduced from nD 1.35007, the normal, to nD 1.34898 during infection. The haemoglobin content was decreased from 61 % to 53 %. There was practically constant leucocytosis. C. considers that Fulton's serum globulin reaction is useful in diagnosis.

Four adult hens were inoculated intramuscularly into the breast with 5 c.c. of serum from three naturally infected donkeys. Seven days later they were killed and histological examinations made of their livers, which showed small foci round the blood vessels composed of accumulations of lymphocytes with some granulocytes. There was no erythrophagy by the Kupffer cells and no hepatic cellular lesions.

Tables are given illustrating the course of infection in the donkeys, and are discussed.

II. This is a detailed description of the histological and macroscopic picture of the donkey cases, in part a repetition.

- OPPERMANN, T., & STÜMPKE, G. (1937). Der Lippengrind (Ekthyma contagiosum) der Schafe und seine Uebertragbarkeit auf den Menschen. [*Lip Scab of Sheep (Contagious Pustular Dermatitis) and Its Transference to Man*].—*Arch. Derm., Berl.* 176. 387-346. 3 figs. [25 refs.]

The authors give a detailed description of the disease in sheep, quote some published cases of human infection from sheep and record a case of ecthyma in a shepherd whose sheep and lambs were nearly all affected. The shepherd developed small scabby lesions on his hands and neck which soon recovered under local treatment. The infection was transmitted experimentally to a healthy lamb by material collected from the shepherd, and from two of his affected lambs to two healthy lambs.—J. E.

- BURNET, F. M., & LUSH, Dora. (1938). Infection of the Central Nervous System by Louping Ill Virus. An Investigation by the Quantitative Egg Membrane Technique.—*Aust. J. exp. Biol. med. Sci.* 16. 233-240. 5 tables. [7 refs.] Using the quantitative egg membrane technique, the authors studied the

infection of the C.N.S. of the mouse by "louping ill" virus. They found that when the virus is inoculated intraperitoneally it usually enters the C.N.S. *via* the olfactory mucosa and olfactory bulb, but not invariably. Trauma of the cerebral hemisphere of mice so inoculated allowed the virus to enter at the point of damage and accelerated the spread of infection. After intranasal inoculation, the virus entered the olfactory bulb and multiplied there, reaching a high concentration before the rest of the brain became infected. This suggested that there is a "physiological barrier" between the olfactory bulb and the rest of the brain. Once the infection passed beyond this barrier it spread rapidly down to the spinal cord and the virus was detectable in large amounts everywhere.—T. S. GREGORY.

RATTI, R. (1938). L'agalassia contagiosa delle capre e delle pecore in Val Bregaglia, Cantone dei Grigioni. [**Contagious Agalactia of Goats and Sheep in Switzerland**].—*Schweiz. Arch. Tierheilk.* 80. 317-320. [In Italian].

Two thirds of the cases were of the chronic type with eye infections, arthritis, abscess formation in the lymph nodes and mammary glands and in the lungs and liver. Induration of the udder was very frequent. The local breeds seem to be more resistant than imported breeds. The annual mortality from this disease during the years 1931-1936 was 6% in adult goats and 1% in adult sheep. During the winter season the incidence of acute mastitis due to this virus falls because there are then only a few animals in full milk. The disease was less frequent in sheep than in goats.

Every method of chemical or serological treatment tried was unsuccessful. The most effective method of dealing with the disease is the elimination of infected animals and a periodical examination of the herd. It is suggested that there may be some connexion between contagious agalactia and worm infestation (though experiments to prove this have not so far been successful), or that the environment may play some part in the incidence of the infection.—HANS GRAF (ZÜRICH).

KRIESEL, H. R. (1938). **A Comparative Study of the Manifestations and Histopathology of Canine Distemper and Experimental Fox Encephalitis Infection in Dogs.**—*Cornell Vet.* 28. 324-330. [8 refs.]

Fifty-four puppies and seven ferrets were inoculated with dog distemper, and 14 puppies and one ferret with the virus of fox encephalitis.

Marked enlargement and oedema of the mesenteric lymph nodes were constant lesions P.M. in the animals affected with dog distemper. Nuclear inclusions occurred in ten puppies, and cytoplasmic inclusions were numerous in all of the ferrets. Variations in dosage of virus, portal of infection and stage of the disease at examination did not materially alter the findings.

The fox encephalitis virus produced a rapidly fatal disease in nine of the puppies, but no symptom of illness in the ferret. Autopsy revealed oedema and petechiae of the thymus and of the mediastinal and mesenteric lymph nodes, sub-endocardial haemorrhage, ecchymoses in the lungs, and an excess of peritoneal fluid. Nuclear inclusions appeared in all of the puppies which became infected, but cytoplasmic inclusions were absent except in one atypical case.

The nuclear inclusions in both diseases were composed of minute pink-staining granules, which in aggregate produced a darker homogeneous body.—D. D. O.

GREEN, R. G., & EVANS, C. A. (1939). **Rapid Diagnosis of Canine Distemper.**—*Cornell Vet.* 29. 36-40. 2 figs. [14 refs.]

Emphasis is laid on the importance of an early and accurate diagnosis of distemper in kennels and fur animal ranches.

The distribution of inclusion bodies, characteristic of canine distemper, in surface epithelium and other tissues is described, and it is stated that an accurate diagnosis of the disease may be obtained by the demonstration of these inclusions in paraffin sections stained with haemotoxylin and eosin. The authors have now elaborated a method whereby the inclusion bodies may be demonstrated within one hour. Smears of scrapings are taken from the lining of the bladder (or if necessary from the trachea and nasal chamber) of two or three animals which have died from the disease or been killed late in its course and are examined for the presence of the characteristic inclusion bodies. Methods of fixing and staining are described.—F. J. ANDREWS.

HERZBERG, K. (1938). Untersuchungen an Influenza-Virus-Stämmen. [**Research on Influenza Virus**].—*Zlb. Bakt. I. (Orig.)*. **143**. 93-106. [12 refs.]

A report of parallel experiments carried out with two strains of influenza virus, one being of human and the other of porcine origin. In general both strains behaved in an identical manner in all tests. Mouse passage by the intranasal route produced in both cases bronchitis and broncho-pneumonia. Culture of virus from mice into eggs and reinoculation into mice produced no change of pathogenicity of either virus. The lesions produced in the egg embryos were similar and the resistance to glycerin of egg-culture virus of both was the same. In neither case did virus-infected mice show any specific secondary bacterial infections. The filtrability of both viruses was the same.—E. J. PULLINGER.

HUPBAUER, A. (1938). Značenje gripe prasadi za naše svinjogojstvo. [**Significance of Piglet Influenza in Swine Breeding in Yugoslavia**].—*Arhiv Minist. Poljopriv., Belgrade*. **5**. No. 12. 119-129. 1 fig., 1 table. [13 refs.] [German summary]. [See also *V. B.* **9**. 469].

An account of the epizootology, aetiology and pathological findings of swine influenza. Control measures are discussed, with particular reference to the method of eradication advocated by WALDMANN [*V. B.* **8**. 90.] which was used with good results at the Križevci Institute in Yugoslavia. The disease is very serious each year in Yugoslavia, the losses being 5-85%, and sometimes even 100%, of the piglets on affected farms, especially among autumn and winter litters.

—B. OSWALD (KRIŽEVCI).

DIAS, E. (1937). O cão como provável reservatório do vírus da febre maculosa brasileira. [**The Dog as a Natural Reservoir of Brazilian Typhus**].—*Brazil-med.* **51**. 1245-1247.

Dogs in affected areas have shown positive Weil-Felix reactions; the susceptibility of dogs to the virus has been demonstrated, and they are hosts of the ticks responsible for infection. For these and for epidemiological reasons, D. considers it very probable that the dog is a natural reservoir of the virus.

I. BLANC, G., & MARTIN, L. A. (1936). L'iridocyclite typhique expérimentale. [**Iridocyclitis in Typhus**].—*Arch. Inst. Pasteur Maroc*. **1**. 391-463. 8 plates, 1 table, 79 graphs. [9 refs.]

II. BLANC, G., & MARTIN, L. A. (1936). Le typhus expérimental de l'âne (virus murin). [**Experimental Typhus in the Donkey**].—*Ibid.* 473-505. 1 table, 22 graphs. [14 refs.]

I. Acute iridocyclitis was set up in sheep and donkeys inoculated with murine typhus virus into the anterior chamber of the eye. The virus did not

become generalized in the body and the infection did not immunize the eye against reinfection.

II. The intravenous inoculation of typhus fever virus into donkeys caused no loss of health and only gave rise to transient fever, during which the serum gave a positive Weil-Felix reaction and possessed some neutralizing power against virus. These properties were, however, soon lost after the return of the temperature to normal.—J. E.

PURCHASE, H. S. (1939). **An Outbreak of Infectious Roup in Young Chickens.** —*Vet. Rec.* **51**. 3-16. 4 figs. on 1 plate, 2 tables. 1 graph. [Numerous refs.]

P. first reviews the literature on catarrhal or diphtheritic affections of the nose, mouth and eyes of fowls, commencing with LOEFFLER'S (1884) investigation of avian diphtheria. The problems arising from confusing nomenclature, complications by secondary invaders and differential diagnosis of this group of diseases are discussed.

The article then outlines an investigation of avian roup of young chickens ("one-eyed roup") caused by a virus [not the same as the other form of roup, which occurs in adult birds, and is primarily associated with a bipolar staining organism]. After inoculation of filtered and unfiltered material by various routes, the period of incubation was between 4 and 10 days; after contact with infected fowls it was 5-11 days, and following contact with infected materials it was 11-20 days. No temperature reaction occurred. The symptoms (including severe catarrh of the respiratory tract, lachrymation, conjunctivitis, diarrhoea and emaciation) and the lesions produced are all minutely described. Birds up to six weeks of age were most susceptible; infection was less certain in six-month-old birds, and adult birds were refractory to infection. No cross-immunity between this disease and fowl pox occurred.

Two species of bacteria were recovered from blood and bone-marrow of naturally affected chicks. One was non-pathogenic, but the other set up necrosis at the point of inoculation and caused death from septicaemia in fowls. Acute septicaemia also occurred in pigeons and rabbits, but g. pigs were more refractory. The organism was Gram-negative and bipolar; its cultural and biochemical characters are detailed. Experiments showed that whole cultures and filtrates of cultures of these bacteria did not set up a roup condition or any immunity to roup in susceptible chicks.

The methods of experimental and natural passage of the disease and the distribution of the virus in affected chicks are discussed, and the differential diagnosis from fowl pox, gapeworm disease and nutritional roup is outlined.

—C. V. WATKINS.

VAN RAECKEL, H., BULLIS, K. L., & CLARKE, M. K. (1938). **Preliminary Report on Infectious Avian Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **93**. 372-375. 3 tables. [3 refs.]

The incidence of this disease appears to be on the increase, particularly in the New England States. The authors confirmed the findings of JONES [(1932). *Science*. **76**. 331.] that the aetiological agent is a virus. The symptomatology of the disease is described. It was transmitted by intracerebral inoculation and by contact. The virus increased in virulence with passage. The evidence available fails to establish the presence of "carrier" birds amongst the survivors of a naturally-occurring outbreak, although the disease appears to be egg-borne and the breeding stock serve as the reservoir of infection.—L. E. HUGHES.

NAKAMURA, J., OYAMA, S., & WAGATSUMA, S. (1937). **Vaccination of Fowls against Chosen Disease (Newcastle Disease) and Fowl Plague.**—*J. Jap. Soc. vet. Sci.* **16**. 427-444 of pt. 1. 10 tables. [17 refs.] [In Japanese: abst. from English summary pp. 55-58 of pt. 2].

The authors attempted immunization against Newcastle disease with several vaccines prepared from a highly virulent virus (strain H). Saline suspensions of infected organs were treated with formalin, chloroform, toluol or tricresol and kept at 37°C. for varying periods, or treated with glycerol or saccharose and heated at different temperatures. Subcutaneous and intramuscular injection of a formalized vaccine, the preparation of which is detailed, gave poor results, but intravenous injection was more efficient, double injections by the latter route at an interval of 5-7 days giving immunity in 54 out of 87 birds 14 days after the last dose, whereas all controls died. The efficiency of different batches of vaccine varied in spite of careful preparation. The other vaccines prepared gave inferior results.

Tests of a formalized fowl plague vaccine prepared similarly to the one described above for Newcastle disease were made with better results; again useful results were only obtained by the intravenous route. Three batches of vaccine were potent after storage for 133 days in a cool room. The immunity was equally good 10 and 107 days after vaccination, but it was reduced after 121 days. Single vaccination by intravenous injection often produced solid immunity, but not as certainly as double administration of the same total dose at an interval of five days.—C. V. WATKINS.

BEAUDETTE, F. R., & HUDSON, C. B. (1938). **Cultivation of Pigeon-Pox Virus on the Chorio-Allantoic Membrane.**—*J. Amer. vet. med. Ass.* **93**. 146-150. 1 table. [2 refs.]

A method of obtaining a pure pigeon-pox virus in culture on the chorio-allantoic membrane of embryonated eggs 9-15 days old is described, followed by serial passage through 19 generations of tissue culture. On account of the great affinity this pox has for follicular cells, which are always subject to bacterial contamination, Berkefeld filtration was essential for the primary culture. Most growth occurred after five days' incubation of the inoculated eggs, the lesions produced in the membranes being identical with those due to fowl pox. The virus withstood up to 38 days' refrigeration between passages, but the virulence of infected membranes was slightly reduced thereby. In neutralization tests with virus and immune serum there was an absence of marked generalized infection of inoculated membranes as compared with lesions produced by virus alone.

Membranes dried *in vacuo* gave "takes" when chickens were inoculated by scarification with concentrations of 0.625 mg. (or more) per c.c. of 50% glycerin solution. Field tests of such vaccines are briefly mentioned.—C. V. WATKINS.

I. LEVADITI, C., FASQUELLE, R., BEQUIGNON, R., & REINIÉ, L. (1938). Influence des *sélecteurs* sur le potentiel encéphalitogène du vaccin jennérien. [Influence of "Selectors" on the Encephalitogenic Potentialities of Vaccine Virus].—*C. R. Acad. Sci., Paris.* **207**. 688-690. [3 refs.]

II. LEVADITI, C., FASQUELLE, R., MESROBEANU, J., REINIÉ, L., STAMATIN, L., & BEQUIGNON, R. (1938). Les "*sélecteurs*". ["Selectors"].—*Rev. Immunol.* **4**. 481-497. 6 figs. [Numerous refs.]

I. In order to explain differences in the affinities for certain tissues of various strains of vaccinia, the authors postulate the existence of epitheliotropic (E) and mesodermotropic (M) elements.

The modification in the virulence of a dermatropic strain and its transformation into neurovaccine depends partly on the proportion of the two elements in a given strain and partly on the selective effect of different methods of propagating the virus, *e.g.*, intracerebral inoculation of rabbits, cultivation in the developing egg, growth in symbiosis with neoplasms, etc. The tissues are regarded as "selectors" of E and M elements respectively.

Experiments with stored virus appeared to demonstrate fluctuations in the proportions of the two elements. Thus, dermovaccine stored at  $-2^{\circ}\text{C}$ . was titrated at intervals by the intracerebral inoculation of rabbits. The number of successful "takes" in the brain was 33% at the 8th day, none at the 82nd, 40% at the 96th, and 55% at the 143rd.

II. Similar to I, but in more extended form.—R. E. GLOVER.

AHLSTRÖM, C. G. (1938). **Virus Tumours in Mammals**.—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 37-46. [Numerous refs.] [In English].

A. reviews the bearing of recent investigations into the tumours of small animals on the aetiology and spread of neoplasms in general. Particular reference is made to the rabbit papilloma virus of Shope and to the experiments of ROUS, KIDD and BEARD [*V. B.* 7. 331.] on the conversion of papillomata into malignant growths by tar, etc.; and to the experiments of ANDREWES and AHLSTRÖM [*V. B.* 9. 392.] on mutation in rabbit fibroma lesions as a result of tarring. The review contains no new facts.—R. E. GLOVER.

## PARASITES IN RELATION TO DISEASE [GENERAL]

CANADA. (1937). [Report of] Associate Committee on Parasitology. [National Research Council, Canada, 1936-1937].—*Rep. nat. Res. Coun. Can.* 1936-37. pp. 106-113. 1 table.

The making of cinematograph films of parasites is reported, and models of various domestic mammals are under construction showing parasites in the organs naturally infected. A cabinet to permit the rapid growing of "worm-free" grass is being obtained, which will aid research into helminthiasis.

HORSE STRONGYLE CONTROL.—Experiments by Dr PARNELL made rapid progress due to provision of more equipment and improved techniques. 3,000 cultures have been completed and 54 chemicals tested for lethal effect.

LIVER FLUKE DISEASE.—Dr SWALES finds evidence that the large Bovidae are naturally resistant to *Fasciola magna*, and that the host-tissue defence prevents reproduction of the parasite. Sheep, however, may die of the infestation.

WARBLE FLY ERADICATION.—Rotenone in oil was disappointing as compared with standard derris powder and soap.

NODULAR DISEASE.—The best form of attack is believed to be destruction of adult parasites [*Oesophagostomum columbianum*] in the young host held over for breeding purposes. Dr SWALES has designed an instrument for use in an endeavour to facilitate delivery of suitable anthelmintics into the abomasum.

STOMACH WORMS OF SHEEP.—Results of 184 autopsies and a suggested treatment for *Trichostrongylus axei* are given.

TAPEWORMS OF SHEEP.—The life-cycle of *Moniezia expansa* is being studied, also the habits of miscellaneous parasites in sheep and other animals, fish, birds, etc.—C. MACKIE.

CERUTTI, C. G. (1937). Importanza della lotta contro le malattie parassitarie che dominano in Sardegna, nei suoi riflessi con l'autarchia della nazione. [**Importance of Controlling Parasitic Diseases of Animals in Sardinia**].—*Azione vet.* 6. 876-888.

C. estimates that 8% of the beef, 25% of the mutton and goat flesh, and 2% of the pork in Sardinia has to be rejected on account of parasitic infestation. It is also responsible for a loss of 15% in the milk yield and 15% of the hides and skins. 20% of the cattle, 6% of the sheep and 10% of the goats die every year as a result of parasitic diseases, the estimated total loss being about £9,000,000 *per annum*.

The system of communal farming that obtains in Sardinia hinders the control of helminth infestation, and C. thinks that the cleansing of the communal pastures should be undertaken by the State or by local authorities. Other methods of control, *e.g.*, by removal of the animals from infected pastures, burning and dressing of pastures, use of anthelmintics, etc., are also discussed.

### PARASITES IN RELATION TO DISEASE [ARTHROPODS]

FELT, E. P., & COLCORD, Mabel. [Editors]. (1938). **Index V to the Literature of American Economic Entomology. January 1, 1930 to December 31, 1934.** pp. 693. Maryland: American Association of Economic Entomologists. [8vo].

This index deals with the whole field of entomological literature published in the U.S.A.

KRANEVELD, F. C., & VAN DER SCHAAF, A. (1937). Een myiasis van de klauwen en hun omgeving bij runderen. [***Cordylobia* Infestation of the Claws of Cattle**].—*Ned.-ind. Bl. Diergeneesk.* 49. 360-369. 16 figs. on 4 plates. [5 refs.] [English and German summaries].

The authors describe a myiasis of cattle in North Celebes, also affecting cattle, water-buffaloes and goats in the Philippines, and caused by the larvae of *Cordylobia intonsus*. The part chiefly affected is the skin bordering on the hoofs, and this may lead to infection of the hoof joints. It is stated that in the rainy season, when the animals are allowed to walk through the flooded rice fields, the muddy soil has a healing effect. Treatment of the condition is discussed.

—JAC. JANSEN (UTRECHT).

OSWALD, B. (1938). Revue des travaux publiés en Yougoslavie sur le problème des tiques et nouvelles recherches sur le poison de leurs oeufs. [**Review of Work Published in Yugoslavia on the Tick Problem and Research on Toxins in the Eggs of Ticks**].—*Ann. Parasit. hum. comp.* 16. 548-559. 3 figs. on 1 plate, 3 tables. [Numerous refs.]

O. describes an outbreak of tick paralysis that occurred in Yugoslavia in 1935; 12 species of ticks have been recorded from that country. It had previously been shown [*V. B.* 9. 163.] that eggs of *Hyalomma scupense* and *Boophilus calcaratus balcanicus* contained a powerful toxin, and by using a standard emulsion of eggs, O. established the presence of a toxin also in the eggs of *Rhipicephalus bursa* and *Rh. sanguineus*, for which the name "ixovotoxin" is proposed. The toxin is thermolabile, and is not destroyed by 0.2% hydrochloric acid, 0.1% saline, or digestion by pepsin or trypsin. Symptoms produced in *g. pigs* by the inoculation of this "ixovotoxin" are identical, and the toxins from each species appear to be related. The duration of paralysis produced by the "toxin" is in inverse ratio to the amount inoculated, whilst the loss of body weight of the animal is

proportional to the duration of illness. Bacteriological tests of tick eggs were carried out at the same time, but were not conclusive, since at times a variety of organisms were grown and at other times the plates were sterile. O. considers it unlikely that the "toxin" in the eggs is identical with that in the salivary glands of the ticks, since, under natural conditions, tick paralysis occurs only at intervals, whilst ticks with "toxic" eggs may be found on the animals all the year round.

—M. L. BINGHAM.

- I. DAVIS, G. E., & COX, H. R. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. I. Isolation from *Dermacentor andersoni*, Reactions in Animals, and Filtration Experiments.**—*Publ. Hlth Rep., Wash.* 53. 2259-2267. 5 tables. [1 ref.]
- II. PARKER, R. R., & DAVIS, G. E. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. II. Transmission by *Dermacentor andersoni*.**—*Ibid.* 2267-2270. [2 refs.]
- III. COX, H. R. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. III. Description of Organism and Cultivation Experiments.**—*Ibid.* 2270-2276. 1 table. [7 refs.]
- IV. DYER, R. E. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. IV. Human Infection.**—*Ibid.* 2277-2282. 1 fig. [5 refs.]

I. Unfed *D.a.* ticks collected near Missoula, Mont., U.S.A. when fed on g. pigs, produced in one case a fatal febrile reaction. The infective agent was passed by inoculation of spleen, blood and urine; it was inoculable by all the usual routes, and infective through depilated skin. Infection was maintained through repeated passages in white rats and mice, but died out in rabbits after two or three passages. Chipmunks and ground squirrels were susceptible, but monkeys failed to react in four attempts. Recovered animals were immune to reinfection. The pathological findings in g. pigs were continuous high fever, and splenic enlargement; subcutaneous or intradermal inoculation resulted also in a local inflammatory exudation.

The infective agent passed through Berkefeld N and W filters, but failed to pass a single Seitz disc. It was resistant to glycerin.

II. The infective agent was transmitted to g. pigs by nymphs which had fed as larvae on a reacting animal, and again by adults resulting from these nymphs. The progeny of females which had fed on a case were also infective both as larvae and as nymphs.

III. When g. pigs reacted after inoculation with bacteria-free filtrates of infected tissue, smear preparations of the exudate or spleen substance showed the presence of rickettsia-like organisms. The agent could not be cultivated on cell-free media, failed to survive more than six sub-cultures on leptospira media, and did not produce angiomatous nodules in inoculated monkeys; it is concluded, therefore, that it bears no relationship to the bartonella organisms. It could be cultivated indefinitely in tissue cultures originating from Berkefeld N and W filtrates, and throughout the series of passages showed the characteristic rickettsia-like bodies.

IV. A febrile condition in a laboratory worker who had been in contact with the virus is described in detail. An infective agent isolated from this case proved to be morphologically, culturally and immunologically identical with the tick-borne virus described above. G. pigs immune to "Q" fever [*V.B.* 9. 163 and 544.] were found to be also immune to the human strain of the tick-borne virus, and it is suggested that the two conditions may be identical.—J. MACLEOD.

- I. TRAGER, W. (1939). **Acquired Immunity to Ticks.**—*J. Parasit.* 25. 57-81. 8 figs. on 8 plates, 8 tables. [Numerous refs.]

II. TRAGER, W. (1939). **Further Observations on Acquired Immunity to the Tick *Dermacentor variabilis* Say.**—*Ibid.* 137-139. 2 tables. [2 refs.]

I. Infestation of g. pigs and, in a few instances, of rabbits, with nymphs or larvae of *D.v.* resulted in the animals becoming relatively immune to subsequent infestations with larvae of this species, so that only small numbers of the parasites succeeded in engorging on the now modified hosts, and many of the parasites on such hosts were undersized or light in colour. The immunity was general, *i.e.*, not confined to the area infested; it developed after two weeks and lasted about three months, in g. pigs.

Repeated infestations had no effect on the ability of nymphs or adult females to engorge, but it is suggested that the amount of the blood meals taken was reduced.

A limited number of cross-immunity tests were made between *D.v.*, *D. andersoni*, and *Haemaphysalis leporispalustris* and it is claimed that infestation by each species immunized against that species and the other two. [In view of the wide variation recorded in the numbers which succeeded in attaching to non-immunized g. pigs, the cross-immunity results are of rather doubtful significance].

A natural host of *D.v.*, the deer mouse *Peromyscus leucopus*, did not develop immunity after one infestation of larvae, but after repeated infestations fewer larvae were able to engorge.

The immunity could be induced by intradermal inoculation of emulsified larvae. Intraperitoneal inoculation of immune serum resulted in some slight degree of immunity. Histological examination showed that the mechanism of the immunity was an intensification of the local cellular reaction to tick bite, so that the mouth parts were rapidly walled off from the food supply. It is suggested that this acceleration of reaction is due to circulating antibodies, and the possible nature of the antigen is discussed.

II. The second paper gives the results of immunization by inoculation of different tissues from partially gorged adult ticks. The antigen appears to be present principally in the salivary glands, but also occurs in the cephalic gland and in the digestive tract.

Specific complement-fixation with immune serum could be demonstrated in the case of immunized rabbits, but the test could not be used for g. pigs, since normal complement was fixed by a combination of g. pig serum with tick antigen.

—J. MACLEOD.

GREGSON, J. D. (1938). **Cytoplasmic Inclusion Bodies in the Engorging Tick.**

—*J. Path. Bact.* 47. 143-153. 17 figs. on 2 plates, 1 table. [9 refs.]

A study of the morphological characters and staining reactions of a type of inclusion body in the gut epithelium of *Dermacentor andersoni* ticks. The bodies could not be found in unfed ticks, and appeared first as minute globules during engorgement. As assimilation proceeded, the globules grew in size. Similar bodies were observed in the subcutaneous layer, in phagocytic cells in the haemocoel, and in ova at different stages of development within the tick. Attempts at culture of the bodies were unsuccessful, and no conclusion as to their nature is hazarded.—J. MACLEOD.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

OLDHAM, J. N. (1938). **Changes in the Names of Worms: the Rules of Zoological Nomenclature as Applied to Veterinary Helminthology.**—*Vet. Rec.* 50. 1131-1138.

O. gives the generally accepted names of 106 different helminth parasites

with their various synonyms. The list comprises 10 trematodes, 22 cestodes, 73 nematodes and one species of *Acanthocephala*. He refers to the *International Rules of Zoological Nomenclature*, as a result of which order is gradually becoming established. Those species in the list which either do not occur, or occur only very rarely, in the British Isles are marked with an asterisk.—A. L. WILSON.

WAGNER, O. (1938). Helminthiasis der Pferde. [**Helminthiasis in Horses**].—*Vet.-med. Nach. Bayer-Meister Lucius*. Suppl. pp. 31-70. 35 figs. on 22 plates. [Numerous refs.]

The life-cycle, symptoms, diagnosis and treatment of the following common parasites of the horse are dealt with:—*Habronema megastoma*, *H. microstoma* and *H. musca*; *Anoplocephala perfoliata*, *A. magna*; *Paranoplocephala mamillana*; *Parascaris equorum*; *Strongyloides westeri*; *Strongylus vulgaris*, *S. equinus*, *S. edentatus*, and *Oxyuris equi*. Methods of control and treatment are described. In strongyle infestations W. recommends either packing the faeces into heaps with periodic turning over of the pile, the fermentation produced being relied upon to kill the eggs and larvae, or the use of calcium cyanamide to kill the eggs and larvae in the faeces; as calcium cyanamide contains much nitrogen, it also increases the manurial value of the faeces.—A. L. WILSON.

LE DUC, A. (1938). Les helminthes de l'éléphant d'Asie. [**Helminth Parasites of the Indian Elephant**].—*Thesis, Alfort*. pp. 131. 30 text figs., 13 figs. on 7 plates. [Numerous refs.]

This thesis may be regarded as a text-book on the helminth parasites infesting the Indian elephant, incorporating many published observations as well as personal ones. The morphology of 32 species of parasites and their eggs is described. An autopsy was made on a circus elephant and from it were obtained 35 litres of parasites, mainly trematodes and strongyles. Microscopic examination of the faeces of three other elephants revealed the presence of strongyle and trematode eggs.—A. L. WILSON.

BADANINE, N. V. (1938). Sur la question d'hélmintofaune du chameau en Turkménie. [**Helminth Parasites of the Camel in Turkoman, U.S.S.R.**]—*Livro Jubilar Prof. L. Travassos*. pp. 61-73. 5 figs. on 1 plate. [12 refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In French].

A list is given of the parasites found P.M. in Bactrian camels and dromedaries between 1928-1937. Worms of the following genera were found:—*Echinococcus* spp., *Stilesia* spp., *Moniezia* sp., *Fasciola* sp., *Dicrocoelium* sp., *Trichostrongylus* spp., *Camelostomylus* sp., *Trichocephalus* spp., *Physocephalus* spp., *Parabronema* sp., *Nematodirus* sp., *Dictyocaulus* sp., *Chabertia* sp., *Oesophagostomum* spp., *Ostertagia* spp., *Haemonchus* sp., *Cooperia* spp., *Thelazia* sp., and *Onchocerca* sp. The list includes *Onchocerca fasciata* and *Thelazia leesei*, which B. states have not hitherto been seen in the U. S. S. R.

AZIM, A. (1939). Helminthes parasites des chiens et des chats en Égypte. [**Helminth Parasites of Cats and Dogs in Egypt**].—*Ann. Parasit. hum. comp.* 17. 32-36. 2 tables. [Numerous refs.]

Of 300 dogs captured and killed for examination in Cairo and elsewhere, 95% were parasitized; all of 150 cats caught in Cairo were parasitized. Usually about four types of parasites were found, mainly in the digestive tract: 90% of the cats and 67% of the dogs had Heterophyidae; other percentages of infestation were:—

*Dipylidium caninum*, in 65 % of dogs, and 50 % of cats; *Taenia hydatigena* in 28 % of dogs, and *Echinococcus granulosus* in 10 % of dogs and only rarely in cats.

WADOWSKI, S. (1938). Niektóre pasożyty jelit drobiu. [**Intestinal Parasites of Poultry**].—*Pam. pats. Inst. nauk. Gosp. wiej. Puławy*. No. 2. pp. 105-139. 8 tables, 2 graphs. [Numerous refs.] [French summary]. [Suppl. to *Wiad. weteryn.* 18. No. 228].

W. examined 200 hens, 100 geese, 55 ducks, 25 pigeons, 23 turkeys and one wild duck; 79 % of the hens, 69 % of the geese, 51 % of the turkeys and 24 % of the pigeons were found to harbour parasites. The following parasites were found :— in pigeons, *Ascaridia columbae*; in turkeys, *Brachyalemus commutatus* and *Heterakis gallinae*; in geese, *Weinlandia collaris*, *Hypomenolepis anatina*, *Drepanidotaenia lanceolata*, *Amidostomum nodularis* and *Heterakis dispar*; in ducks, *Echinostomum revolutum*, *Echinoparyphium recurvatum*, *Hymenolepis tenuirostris*, *Ascaridia galli*, *Heterakis dispar* and *Polymorphus boschadisi*, and in fowls, *Echinostomum revolutum*, *Amoebotaenia sphenoides*, *Choanotaenia infundibulum*, *Hymenolepis cantianiana* and *H. carioca*, *Railletina tetragona*, *R. achinobothrida* and *R. cesticillus*, *Ascaridia galli* and *A. lineata*, *Capillaria columbae*, and *Heterakis gallinae*.

BAKER, D. W. (1939). **Survival of Worm Parasite Infection on New York State Pasture**.—*Cornell Vet.* 29. 45-48. 2 tables. [2 refs.]

An area of normal grazing which had not been pastured for 21 years was contaminated by grazing off the available herbage with six heavily parasitized sheep. After about a year two worm-free lambs were allowed to graze the same area. Faecal examination showed ova within a month, and autopsy revealed infestation with *Haemonchus contortus*, *Ostertagia circumcincta*, *Cooperia curticei*, *Nematodirus spathiger*, *Bunostomum trigonocephalum*, *Moniezia expansa*, *Trichuris ovis*, *Oesophagostomum columbianum*, and *Trichostrongylus* sp. The plot was then vacated for 21 months, and the experiment repeated. Heavy infestation again occurred.

A parallel test with calves showed that *Ostertagia ostertagi*, *Cooperia oncophora*, and *Trichuris bovis* remained viable in pastures for at least nine months.—D. D. O.

LÜHRS, E. (1938). Planmäßige Bekämpfung der Leberegelseuche. [**Planned Control of Liver Rot**].—*Tierärztl. Rdsch.* 44. 41-45. 3 graphs. [3 refs.]

Conventional details are given concerning the treatment of pasture and watering places to control the parasites and their intermediate hosts. Cattle should be treated for distomatosis in August, November and January, and sheep in June, October, and January.—A. L. WILSON.

SRIVASTAVA, H. D. (1938). **A Study of the Life-History and Pathogenicity of *Cotylophoron cotylophorum* (Fischöder, 1901.) Stiles and Goldberger, 1910 of Indian Ruminants and a Biological Control to Check the Infestation.**—*Indian J. vet. Sci.* 8. 881-885. 11 figs. on 5 plates. [14 refs.]

S. has established experimentally the life-cycle of the parasite in India. Adult amphistomes were obtained from the rumen of sheep and goats and incubated until eggs were laid. When miracidia hatched out of the eggs they were used to infest the snail *Indoplanorbis exustus* raised in the laboratory. The sporocyst, redia and cercaria are described, and it was found that, whereas adult amphistomes were practically non-pathogenic, the immature specimens were markedly pathogenic. An interesting discovery was that when snails infested with the aquatic oligochaete, *Chaetogaster limnaei*, were used they could not be infested with amphistome larvae, but when free from the oligochaete they were readily infested.

—A. L. WILSON.

REYES, R. V. (1938). Un trematodo intestinal de los bovídeos (*Zygocotile Lunatum*, DIESING 1896). [*Z.I. An Intestinal Trematode of Cattle*].—*Rev. Med. vet., Bogota*. 8. 4-6. 1 fig. [4 refs.]

This trematode was present in the fourth stomach of a cow. The life-history is unknown; a description is given of the parasite.

JOYEUX, C., & BAER, J. G. (1937). Evolution du *Taenia taeniaeformis* Botsch. [*Development Cycle of T.t.*].—*C. R. Soc. Biol. Paris*. 126. 359-361. [2 refs.]

A description is given of the larval stage after removal from the cyst. Ripe segments of *Cysticercus fasciolaris* were fed to four young cats and the development of adult parasites at different stages was studied.—A. L. WILSON.

ORTLEPP, R. J. (1938). **South African Helminths. Part II. Some Taenias from Large Wild Carnivores.**—*Onderstepoort J. vet. Sci.* 10. 253-274. 19 text figs., 11 figs. on 1 plate, 1 table. [8 refs.] [See also *V. B.* 9. 248].

Seven species of *Taenia*, hitherto unrecorded, are here described, viz.:—*T. bubesei* and *T. gonyamai* from lions, *T. ingwei* from a leopard, *T. hlosei* and *T. acinomyamai* from cheetahs and *T. jackalsi* and *T. pungutchui* from jackals; in addition the species *T. multiceps* and *T. sertalis* are recorded from jackals and *T. pisiformis* from a wild dog.

RAEVSKAJA, Z. A. (1937). Opyty po degel'mintizacii vnešnej sredy v otnoženii ankilostomidozov i askaridozov sobak. [*The Destruction of the Eggs of Dog Hookworms and Ascarids on the Ground*].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin*. pp. 560-564. Moscow: Lenin. Acad. Agric. Sci.

R. gives the results of numerous viability tests on the eggs of dog hookworms and ascarids *in vitro* and on the ground, using solutions of phenol, with or without sulphur, and corrosive sublimate. For practical purposes it was found that eggs on the ground could be killed in about three days by copious irrigation with 5% phenol.

BACCI, I. (1939). Le alterazioni del sangue nei polli infestati sperimentalmente con ascaridi. (*Heterakis Papillosa* ed *Inflexa*). [*Alterations in the Blood of Fowls Infested Experimentally with Heterakis*].—*Nuova Vet.* 17. 90-95. 1 fig., 3 tables.

Eight fowls were used for this experiment and two were kept as controls. The examination of the blood was begun when eggs began to be recovered from the faeces. The number of R.B.C. was reduced from 3,231,500, the normal figure, to 2,280,000 and even to 2,000,000. This decrease was accompanied by anisocytosis, poikilocytosis and polychromatophilia. The most important variation in the leucocytic ratio was an intense eosinophilic leucocytosis with the occurrence of eosinophile and pre-eosinophile myelocytes. Cells resembling Rieder cells were also often seen. There was also intense thrombocytosis.

The following are the proportions after 150 days from the beginning of the infestation:—R.B.C. per c.mm. 2,280,000, haemoglobin 44%, W.B.C. per c.mm. 98,600, lymphocytes 29%, giant mononuclear leucocytes 6%, immature forms 1%, Rieder cells 7%, polynuclear neutrophils 16%, eosinophiles 30.5%, pseudo-eosinophiles 10% and basophiles 0.5%. For every 100 leucocytes there were 401 thrombocytes.

CLAPHAM, Phyllis A. (1938). **Are there Host Strains within the Species of *Syngamus trachea*?**—*J. Helminth.* **16.** 49-52. [5 refs.]

C. found that chickens, partridges and pheasants could be readily parasitized by *S.t.* when fed with earthworms containing infective eggs. The larvae were cultured from eggs of *S.t.* obtained from the pheasant, partridge, jackdaw, crow, jay, and magpie. Thus there are apparently no host strains, or, if a physiological difference exists, passage through the intermediate host seems to remove it; hence, wild birds may be important factors in the spread of the disease. As yet, little is known regarding the site of these worms in the trachea of different birds.—M. L. BINGHAM.

LEVINE, P. P. (1938). **Infection of the Chicken with *Capillaria columbae* (Rud).**—*J. Parasit.* **24.** 45-52. 1 table. [17 refs.]

Studies on the life cycle of *C. columbae* supported the findings of other authors, whose work is briefly reviewed. Experimental feeding of chickens with *C. columbae* produced loss of weight, emaciation and diarrhoea, associated with a catarrhal enteritis and desquamation of the intestinal epithelium, and in some cases, death. Infection could not be prevented by feeding mash containing 2% tobacco dust by weight, nor were single doses of carbon tetrachloride or tetrachlorethylene effective in removing the parasites from individual birds. As a control measure, pigeons should be kept away from poultry runs as they can readily transmit the infection to chickens.—M. L. BINGHAM.

BAYLIS, H. A. (1938). **Notes on some Species of the Nematode Genus *Cooperia* from Cattle and Sheep.**—*Vet. Rec.* **50.** 288-285. 3 figs. [6 refs.]

*C. mcmasteri* should be regarded as a distinct species, since the form of the tips of the spicules and the genital cone show constant specific characters. It was originally recorded in a calf in New South Wales, and was recently found there in sheep also. It has more recently been described by B. as occurring in a lamb from North Wales. *C. nicoli* must be regarded as a synonym of *C. pectinata* and *C. fieldingi* as a synonym of *C. punctata*. *C. fieldingi* and *C. curticei* are not synonymous. TRAVASSOS [*V. B.* **9.** 688.] records eleven species of *Cooperia*, eight known to occur in ruminants. To these should be added *C. spatulata* described by B. occurring in cattle and sheep in Malaya and Australia.—L. E. HUGHES.

SPIEGL, A. (1938). Die Magenwurmseuche der Schafe als Aufzuchtkrankheit und die bei der Bekämpfung dieser Seuche im Jahre 1937 gesammelten Erfahrungen. [**Disease in Breeding Sheep and Lambs due to Stomach Worms and its Control in 1937**].—*Dtsch. tierärztl. Wschr.* **46.** 777-779.

Wide-spread infestation with stomach worms had been a severe handicap to sheep-breeding in Saxony, causing, in addition to actual deaths, retarded development of young animals, birth of weakly lambs, poor wool production, etc. An extensive campaign was launched against these parasites. In 388 flocks there was clinical evidence of disease. 9,000 samples of faeces were examined, and 80,000 sheep were dosed. Eggs and larvae of stomach-worms were detected in 78% of faecal examinations, and in about half of these in such numbers as to indicate a heavy infestation of the flock. The principal cause of disease was *Haemonchus contortus*, *Trichostrongylus* and *Ostertagia* species being less frequently found. Lungworm larvae were detected in 11.6% of samples, tapeworm eggs in 7.6%, and fluke eggs in 0.8%.

The anthelmintic chiefly used was a commercial preparation (Sprehn's tablets); details of dosage are not given. Dosing was repeated three times at four-weekly

intervals in heavily infested flocks. Results, on the whole, were good, and losses were considerably diminished.—H. E. HARBOUR.

MALYGIN, S. A. (1937). Anatomija i morfologija vidov roda *Strongyloides* (Grass, 1879) domašnih zivotnyh. [*Anatomy and Morphology of the Strongyloides of Domestic Animals*].—*Papers on Helminthology Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin*. pp. 888-895. 5 tables. Moscow: Lenin Acad. Agric. Sci.

The article describes *Strongyloides* spp. of domestic animals:—*S. westeri*, *S. papillosus* and *S. suis*. The differential morphology of the species enumerated are described.

COPPINI, R. (1938). L'acuariosi (o disfaragosi) dei polli in Umbria. [*Acuaria hamulosa Infestation in Fowls*].—*Nuova Vet.* 16. 312-316. 3 figs. [German summary].

Infestation with *A.h.* has been observed in fowls, pigeons, peacocks, geese, ducks, and swans. The larvae develop in the muscular tunic of the gizzard. Symptoms are lassitude, increasing emaciation, and general cachexia in spite of a good appetite; death follows in five or six weeks. Diagnosis is difficult in the living subject, but easy on P.M. examination. Affected birds can be treated with essence of turpentine in gelatine capsules. C. found that there were usually no lesions except in the digestive organs, especially the gizzard, but in the case of one fowl he found the liver and spleen seriously diseased.—S. F. J. HODGMAN.

TRUONG-TAN-TGOC. (1937). Filariose du canard domestique en Cochinchine due à *Oshimaia taiwana* (Sugimoto 1919). [*Filariasis of the Domestic Duck in Cochinchina due to O.t.*].—*Bull. Soc. Path. exot.* 30. 775-778. [5 refs.]

T. describes the seasonal incidence of the parasite in young domestic ducks, and also deals with the susceptibility of various breeds of ducks to infection. The condition first manifests itself as a tumour under the lower mandible. The tumour contains the parasites and if not removed may cause death of the bird by asphyxia and inanition. Prophylactic treatment and symptoms are described.

—A. L. WILSON.

## IMMUNITY

GADOLA, A. (1938). La intrapalpebrotubercolinnizzazione nei bovini. [*The "Intrapalpebral" Tuberculin Test in Cattle*].—*Clin. vet., Milano.* 61. 1-23 and 59-82. 10 figs. on 4 plates, 15 tables. [17 refs.]

In Italy, the method most commonly used for the detection of tuberculous animals is the subcutaneous test. G. considers that the value of the "intrapalpebral test" is not sufficiently recognized, and he gives details of tests carried out on 1,507 bovines; 89.79% of those which reacted showed macroscopic lesions, but G. was not able to perform g. pig inoculation tests on those from which lesions were absent.

During these experiments the relative value of various makes of tuberculin was tested, and it is stated that Petragani's synthetic tuberculin gave the best results.—A. J. CASSAR.

SMITHBURN, K. C., & SABIN, Florence R. (1938). **Reactions of Normal and Tuberculous Animals to Tuberculo-Protein and Tuberculo-Phosphatide.**—*J. exp. Med.* **68**. 641-658. 5 figs. on 1 plate, 4 tables. [Numerous refs.]

Previous studies on cellular reactions to tuberculo-phosphatide are reviewed. Inoculation of tuberculo-phosphatide into normal g. pigs produced in 3-4 days a firm erythematous nodule which did not ulcerate and which disappeared leaving no scar. Microscopically there was migration of neutrophils and proliferation of monocytes. In g. pigs experimentally infected with TB. the reaction was hastened and necrosis of the tissues followed. The histological changes were similar in nature to those in normal animals but were accentuated. Epithelioid cells were predominant.

Tuberculo-protein produced no macroscopic reaction in normal animals. There was a neutrophilic and monocytic reaction; epithelioid cells did not appear. In tuberculous animals there was a rapid and marked local reaction to tuberculo-protein which increased in size until the fourth day and then regressed. There was haemorrhage, necrosis and tissue degeneration accompanied by infiltration of neutrophils and monocytes. Giant cells and epithelioid cells were present.

Tuberculo-phosphatide did not hypersensitize animals to tuberculin, but repeated injections of tuberculo-protein into normal animals invoked a mild hypersensitivity to subsequent injections of tuberculin.—J. REID.

- I. THAYER, J. D. (1938). **Further Studies on Methods of Desensitization of Tuberculous Guinea-Pigs.**—*Tubercle, Lond.* **19**. 313-322. 5 tables. [18 refs.]
- II. THAYER, J. D. (1938). **Desensitization in the Treatment of Tuberculous Guinea-Pigs.**—*Ibid.* 365-374. 7 tables, 1 graph. [14 refs.]

I. This article records attempts to estimate the value as desensitizing agents of various tuberculi and of tubercle bacilli killed by different methods. The methods of preparation of the antigens are described.

Bacilli killed by ether, chloroform or nitrous acid were equally efficacious in producing desensitization of experimentally infected g. pigs, but the inoculation of the materials so obtained caused large sterile abscesses at the site of injection. Tuberculin and glycerol extract of tubercle bacilli sensitized by immune serum were found to be of equal desensitizing value. Treatment with tuberculin precipitated by trichloroacetic acid was more effective in desensitizing than was administration of old tuberculin.

II. The effect of tuberculin precipitated by nitrous acid was comparatively low in toxic action and this antigen had a correspondingly reduced desensitizing value. Synthetic medium tuberculin was shown to give the best results of any antigen used. Tuberculin precipitated by trichloroacetic acid was a more powerful desensitizing agent than was the purified protein derivative.

Daily increasing doses of all antigens tried were more effective in producing desensitization than were doses increased weekly.

A virulent strain of bacilli caused a too rapid progression of disease to permit differences in treated and untreated animals to be demonstrated.—J. REID.

EHRICH. (1937). **Die Frischmilchschnellagglutination zum Nachweis der Abortus-Bang-Infektion. [Rapid Milk Agglutination Test for Diagnosis of Bovine Contagious Abortion].**—*Z. InfektKr. Haustiere.* **52**. 163-179. 2 figs., 5 tables. [13 refs.]

A report of a critical comparison of the rapid slide and slow tube agglutination tests for the presence of *Brucella abortus* antibodies in milk. Over a series of 1,044 samples the two tests were in agreement only in 74% of instances. It is concluded

therefore that the rapid slide test is not suitable for replacing the ordinary slow tube method.—E. J. PULLINGER.

FEDELI, A. (1938). Sulla standardizzazione del metodo di agglutinazione nella diagnosi delle brucellosi animali. [**Standardization of the Agglutination Test for Brucella**].—*Profilassi*. **11**. 81-87. [French and German summaries].

F. discussed the proposals made for the standardization of the agglutination test, with particular reference to those recently made at a meeting of the Office International des Epizooties [see *V. B.* **8**. 163].

I. MEINICKE, E. (1938). Zur Technik meiner Brucellose-Flockungsprobe : M.B.F. (Zentrifugierverfahren). [**Technique of the Meinicke Flocculation Test for Brucellosis**].—*Dtsch. tierärztl. Wschr.* **46**. 177-179. 1 table. [1 ref.]

II. MEINICKE, E. (1938). Meine Brucellose-Flockungsprobe (M.B.F.) als Sedimentier oder Kuppenmethode. [**The Meinicke Reaction as a Sedimentation Method**].—*Ibid.* 193-197. [11 refs.]

I. A report of modifications of the standard Meinicke-Klärung test for contagious abortion which are claimed to increase the sensitivity and reliability of the test. Modifications include a method of determining by titration, the optimum amount of *Br. abortus* antigen to add to the Meinicke-Klärung extract. A further safeguard is the introduction of an alkaline broth control.

II. A report of further modifications of the above test in which centrifugation of the tests is omitted, and instead they are allowed to deposit sediment overnight at room temperature. The results obtained by this simplified technique are claimed to be as satisfactory as those obtained by centrifugation.—E. J. PULLINGER.

SCHEIBE, H. (1939). Fehlerquellen bei der Langsamagglutination auf *Brucella bovis*. [**Sources of Error in the Slow Agglutination Test for Bovine Brucellosis**].—*Dtsch. tierärztl. Wschr.* **47**. 34-38. [11 refs.]

A discussion of those technical errors which may interfere with the ordinary tube agglutination test for bovine contagious abortion. S. concludes that the most serious difficulty encountered is the growth of contaminating bacteria in the test fluids during incubation ; this can be eliminated, however, by including a preservative such as chinisol in the diluent. [Other important factors not mentioned are the use of unstandardized antigen and the preparation of antigen from rough or semi-rough strains of *Br. abortus*].—E. J. PULLINGER.

GRYCZ, E., SOŁTYS, M., TEKLIŃSKI, A., & ZYLBERTAL, S. (1938). Badania porównawcze w rozpoznawaniu *Brucella bovis* odczynami—aglutynacji, wiązania dopełniacza i alergicznym. [**Comparative Study of the Diagnosis of *Br. abortus* Infection by the Agglutination, Complement-Fixation, and Allergic Tests**].—*Pam. pańs. Inst. nauk. Gosp. Wiej. Puław.* No. 2. pp. 37-44. 6 tables. [12 refs.] [French summary]. [Suppl. to *Wiad. weteryn.* **18**. No. 223].

For the allergic test, the authors used "Brucellin P", which is said to be similar to Dubois's brucellin, except that a minimal amount of "R" strain material (amount not given) from a growth on liver agar is added. It was found that the serological and allergic tests disagreed in about 60% of cases. The authors are continuing their experiments.

LEHNERT, E. (1988). Sero-och bakterioterapien i veterinärmedicinen. [**Serum and Vaccine Therapy in Veterinary Medicine**].—*Svensk VetTidskr.* **43**. 384-407.

A general account of the subject.—GUSTAV NAERLAND (OSLO).

## DISEASES, GENERAL

PEGREFFI, G. (1987). Le malattie infettive che dominano in Sardegna ed i mezzi per combatterle. [**Animal Diseases in Sardinia**].—*Azione vet.* **6**. 854-858.

The chief diseases of animals in Sardinia are discussed, and methods of control suggested. The most important infections are:—mastitis in cattle, sheep and goats; enterotoxaemia, and other anaerobic infections; foot-rot; contagious pustular stomatitis, and contagious pustular dermatitis.

PETROVIĆ, D. M. (1988). Da li je objašnjena etiologija apoplektiformnih uginjanja ovaca u Jugoslaviji? [**The Aetiology of Sudden Death of Sheep in Yugoslavia**].—*Jugoslav. vet. Glasn.* **18**. 504-518.

P. discusses sheep diseases associated with short illness in Yugoslavia, with special reference to anaerobic diseases. He also draws attention to the recently recorded losses of sheep due to acute liver fluke infestation.—B. OSWALD (KRIŽEVCI).

WIELAND, G. (1987). Consideraciones acerca de la explotación y producción del ganado ovejuno en el Departamento de Huancavelica. [**Sheep Raising in Huancavelica, Peru (with Notes on Diseases)**].—*Cart. Direc. Agric. Peru.* No. 81. pp. 81. 8 figs. [10 refs.]

This comprehensive pamphlet deals with the systems of pasturage, and with the shearing, dipping, and cross-breeding of sheep, and their diseases and wool-bearing properties in the Department of Huancavelica, Peru.

Change of pasture occurs three times yearly; flocks are grazed on fenced pastures which are burned every fifth year and subsequently re-sown with a mixture rich in white clover and rye-grass.

Notes are included on lamb dysentery and worm infestations.—J. PASFIELD.

BARBONI, E. (1988). Studio di una infestione da trichuris in nutrie (*Myocastor coypus*) morte di colibacillosi. [**Trichuris Infestation and Bact. coli Infection of Nutria**].—*Nuova Vet.* **16**. 67-72. 2 figs., 1 table.

B. discusses the systematic place of *Trichuris* among the nematodes. He describes lesions found in two dead nutria sent to the Institute of Veterinary Pathology, Perugia. The intestines and caecum were found to contain *Tr. leporis*.

*Bact. coli* was isolated from lesions in the spleen, and from blood, heart and kidneys. The cause of death was not ascertained.

WALDHELM, R. (1987). Untersuchungen über den Harnstoff-gehalt des Speichels bei gesunden und nierenkranken Pferden. [**Urea Content of the Saliva of Healthy Horses and of those Affected with Kidney Disease**].—*Inaug. Diss., Hanover.* pp. 98. 1 table, 1 chart.

The urea content of the saliva and blood of 28 horses with no symptoms of kidney disease was estimated by titration with 5% mercuric sublimate solution. A flow of saliva was produced by injecting 1 c.c. of lentin. The average figure for unfiltered saliva was 57 mg.% (variation 44.4-74 mg.%), for filtered saliva 55.9 mg.% (variation 45.6-78 mg.%) and for protein-free saliva 51.1 mg.% (variation

39-64 mg. %). The average figure for blood urea was 45.8 mg. % (variation 28.66-56 mg. %). In one case the blood urea was higher than the saliva urea ; this is considered to be due to excessive salivation after the injection of lentin.

In four cases of nephritis there was an increased content of urea in the saliva, unfiltered saliva containing 98.4-100.2 mg. %. In another case, a horse which gave an excessive response to lentin, the urea was within normal limits although albumin was present in the urine. One case showed no significant increase.

—A. T. PHILLIPSON.

WEBSTER, W. M. (1936). **Contagious Ophthalmia in Sheep.**—*Proc. Ann. Meet. Sheep. Fmrs. N.Z., 1936.* pp. 79-83.

Contagious ophthalmia of sheep can be a serious problem. In New Zealand it usually appears in late summer or early autumn, and most of the members of an infected flock become involved. It is characterized by photophobia, conjunctivitis, corneal opacity, irido-cyclitis, and excessive lachrymation. In severe cases proptosis and keratocoele often follow. The condition is bilateral and causes temporary blindness, but there is comparatively little constitutional disturbance. Recovery occurs spontaneously within 14-21 days, but is assisted by the instillation of 10% "argyrol" into the eyes. A natural attack of the disease confers a moderately solid and lasting immunity. Rickettsia have been incriminated as the probable cause of the condition [*V. B.* 6. 122.], but the method of transmission has not yet been established.—D. D. OGILVIE.

LANFRANCHI, A., & SEREN, E. (1938). Ricerche su la trasmissione sperimentale e su la immunizzazione nella papillomatosi cutanea dei bovini. [**Transmission of and Immunization against Skin Papilloma in Cattle**].—*Nuova Vet.* 16. 32-43. 24 text figs., 2 figs. on 2 plates, 2 tables.

After a brief reference to the work done by other authors proving the contagious nature of papillomata from bovine to bovine and to man, the authors describe their personal experiments and conclusions. By applying a few c.c. of an emulsion of warts obtained from a naturally infected calf to a scarified abdominal area in a calf, they succeeded in making four passages in series. In the first three passages both local and diffuse lesions, similar to natural papillomata, were obtained, while in the fourth passage the lesions were only localized. The authors next tried to immunize animals, using homologous as well as heterologous material, the latter consisting of Rous sarcoma of fowls. The immunity due to sarcoma was far inferior to that produced by papillomata.—A. J. CASSAR.

PIEPENSTOCK, H. (1937). Histologische Untersuchungen der regionären Lymphknoten des Schweines im Verlauf von Knochenbrüchen in differential diagnostischer Hinsicht ähnlicher Veränderungen bei Virusschweinepest. [**Histological Examinations of Regional Lymph Nodes of Swine with Bone Fractures, with regard to Similar Changes in Swine Fever**].—*Inaug. Diss., Hanover.* pp. 35. 2 tables. [14 refs.]

Considerable attention has been paid by several workers to the haemorrhagic character of the lymph nodes in S.F. From a histological study of the lymph nodes draining areas involved in fractures in 20 pigs, P. clearly distinguishes between the histological features of simple blood resorption following injury and the specific regressive changes observed in S.F. For a diagnosis of the latter disease it is necessary to consider the clinical history and P.M. findings and, wherever possible, to carry out a histological examination. A haemorrhagic condition of one or more lymph nodes is not uncommon in pigs, and, he states, is not necessarily associated with the presence of swine fever.—E. G. WHITE.

BLOUNT, W. P. (1989). **Haemocytoblastosis**.—*Vet. J.* **95**. 91-102.

EMMEL's work on the aetiology of fowl paralysis, leucaemia, and allied conditions in animals [*V. B.* **8**. 798.] is discussed. B. made an attempt to confirm it in the British Isles.

A comparison of the blood picture in ten chicks with caecal coccidiosis with that in an equal number in which the small intestine was involved showed leucocytosis to be characteristic in the former, whereas in the latter there was a definite leucopenia. This is contrary to the experience of EMMEL, who found that leucocytosis invariably accompanied haemocytoblastosis. Nor, in the cases studied by B., did the degree of haemocytoblastosis bear direct relationship to the disease condition, to which it is suggested that it is most probably merely a sequel.

Twenty-four cases of F.P. were also examined. Haemocytoblastosis did not appear to be an essential factor of the disease, advanced features of this condition being observed in only two cases of F.P., and no signs at all in 14. In addition, haemocytoblastosis was observed in healthy one-day-old chicks, in pullets following injections of liver extract, and during diseases due to viruses, bacteria, and protozoan parasites.

B. observed all stages between the typical haemocytoblastosis picture reported by EMMEL and the normal picture. He considers, therefore, that haemocytoblastosis is merely a myeloid response, and not a disease in itself.—D. D. OGILVIE.

FRASER, A. H. (1988). **Biological Factors Involved in the Problem of Poultry Mortality**.—*Harper Adams Util. Poult. J.* **23**. 317-327. [6 refs.]

F. describes an outbreak of disease which he believes to have been fowl paralysis although it was not confirmed by P.M. examination.

In a preliminary isolation experiment, the death rate from fowl paralysis in day-old chicks reared on clean ground under conditions of partial isolation was 0.89%, compared with 14.01% in the control flock.

A further experiment, although not completely successful due to the introduction of coccidiosis, gave further proof of the value of isolation as a control measure. F. speculates on the possibility of an infective agent as the cause of fowl paralysis.—J. E. WILSON.

SCHMID, E. (1937). Beziehung des Keimgehaltes bebrüteter Eier zur Nabelinfektion bei Kücken. [**Connexion between Bacterial Content of Hatching Eggs and Navel Infection in Chicks**].—*Inaug. Diss., Munich*. pp. 31. 7 tables. [20 refs.]

S. states that his investigations indicate that navel infection which frequently kills chicks during the first nine days from hatching, is caused by a number of bacteria (*Bact. coli*, staphylococci, diplococci, and others) commonly present in eggs that have failed to hatch and in chicks that died before hatching. The trouble might be controlled by the selection of resistant lines of hens, and by strict sanitation of the hatcheries.

DARRASPEN, E., FLORIO, R., & MEYMANDI, M. H. (1989). Des modifications humorales dans certaines variétés de tumeurs oculaires, cérébrales et viscérales, chez les équidés, et les carnivores domestiques. Dédutions pathogéniques et cliniques. [**Humoral Modifications in Certain Varieties of Ocular, Cerebral and Visceral Tumours in Equines and Domestic Carnivores**].—*Rev. Méd. vét., Toulouse*. **91**. 65-92. [Numerous refs.]

A review is given of previous work dealing with the relation of neoplasms to tissue metabolism, with special reference to the cholesterol, glucose, polypeptide

and urea content of the blood and the alkali reserve of the plasma. The authors have attempted to assess the significance of the level of these substances in the diagnosis and prognosis of certain animal tumours.

On the basis of the finding of a high blood cholesterol in a single case of "cholesteatoma" of the lateral ventricles in a horse, the authors stress the diagnostic importance of cholesterol estimation in this disease. [Evidence based on a single case would hardly appear to warrant a generalization and, in addition, the "cholesteatoma" is now generally regarded merely as a granulomatous mass containing a large amount of cholesterol and not as a neoplasm].

The only other finding of interest is that a high polypeptide content of the blood indicates excessive proteolysis resulting from a large tumour and points to an unfavourable prognosis.—E. G. WHITE.

DAWSON, E. K., INNES, J. R. M., & HARVEY, W. F. (1938). **Debatable Tumours in Human and Animal Pathology. V. Giant-Cell Tumour of Bone.**—*Edinb. med. J.* 45. 491-504. 1 text fig., 45 figs. on 4 plates. [Numerous refs.] [See also *V. B.* 8. 791].

The giant-cell tumour of bone is a highly cellular neoplasm, osteogenic in character, and composed typically of two types of cell—multinucleated giant cells and polyhedral or fusiform cells. A large number of synonyms include myeloid tumour, myeloma, osteoclastoma, giant-cell sarcoma, giant-cell epulis, etc. The tumour may recur after removal, but rarely gives rise to metastases.

It is suggested that trauma and haemorrhage are concerned in the production of these neoplasms, which are in the nature of an osteogenic tissue reaction and proliferation which may ultimately regress, but which, in rare cases, acquires the characters of an osteogenic sarcoma. It is thus probably intermediate in character between reactive tissue and true neoplasia. Of the 117 tumours studied, all but two were from human material.—E. G. WHITE.

BLANCHARD, L., POISSON, J., & DRIEUX, H. (1939). *Pathologie comparée des tumeurs du thymus. Son intérêt pour l'histogénèse.* [**Comparative Pathology in Histogenesis of Thymus Tumours**].—*Rec. Méd. vét.* 115. 129-153. 15 figs. [8 refs.]

A review of the literature dealing with the thymus in animals is followed by a histological account of ten tumours of this gland (four in the horse, one each in a sheep, calf, pig and dog, and two in rabbits). The structure of the neoplasms was so varied as to render an adequate summary of the findings impossible. Both benign and malignant tumours were encountered. A constant finding was groups of epithelial cells in varying stages of differentiation, together with small spaces lined by columnar or cubical epithelium, and occasional Hassal's corpuscles. The points of distinction between true thymus neoplasms and lymphomata or lymphosarcomata arising from lymphoid tissue are discussed. A suitable classification of the tumours is promised in a subsequent paper.—E. G. WHITE.

BERGE, B. (1937). *Sarkomatose und Lymphosarkomatose bei je einem Hund.* [**Sarcomatosis and Lymphosarcomatosis in Dogs**].—*Inaug. Diss., Hanover.* pp. 48. 1 table. [Numerous refs.]

B. gives a useful review of the statistics from many countries dealing with the incidence of neoplasms in the dog. He also describes in detail two unusual cases observed during 1936, discussing in each the literature relating to the particular condition.

The only feature of interest in the first case is the wide-spread metastases—

in adrenals, liver, spleen, lungs, prostate and fourth rib—of a round cell sarcoma which is considered to have arisen in the kidney. The description given of the second case as lymphosarcomatosis of various organs and lymph nodes would seem to place it in the category of "lymphocytoma" as used by FELDMAN [(1930). *J. Amer. vet. med. Ass.* **77**, 294]. [Other names given to similar conditions in dogs include Hodgkin's disease, pseudo-Hodgkin's disease, pseudo-leucaemia, etc. In view of recent advances in the classification of related conditions in human pathology, some attempt to classify these conditions in animals would be of considerable use in avoiding confusion of nomenclature and in assisting diagnosis and prognosis].—E. G. WHITE.

BALL, V., & GIRARD, H. (1936). Les circumanalomes bénins et les circumanalomes malins. [**Benign and Malignant Tumours of the Circumanal Gland**].—*Rev. Méd. vét., Toulouse*. **88**, 545-556, 7 plates.

The term "anal glands" is frequently employed incorrectly to indicate any or all of the glandular structures related to the anus in the dog. This paper describes the structure of the various glandular organs under the terms "circumanal glands", which surround the anus and from which neoplasms most often arise; "external anal glands" or glands of the anal sacs, which are a pair of saccular structures one on each side of the anus, in the wall of which are numerous glands, and the "internal anal glands", a series of 12-15 lobules opening into the anus and visible only in histological sections.

Neoplasms of the circumanal glands are commoner in male dogs than in bitches, and are most frequently found in animals between the ages of 6 and 18 years. Benign and malignant neoplasms occur, the former being more common. Three types of adenocarcinoma are described, but no account is given of their clinical features or macroscopic appearance.—E. G. WHITE.

PARSONS, D. L. (1936). **Blood Changes in Mice Bearing Experimental Sarcomas:** (a) Sarcomas Induced by a Derivative of 1:2:5:6-Dibenzanthracene; (b) Sarcomas Produced by Cell-Free Filtrates of Mal. Sarcoma 1.—*J. Path. Bact.* **43**, 1-22. 12 text figs., 16 figs. on 9 plates, 5 tables. [4 refs.]

P. refers to the work of COOK [(1931). *J. chem. Soc.* 3277.] who injected the water-soluble compound sodium 1:2:5:6-dibenzanthracene-9:10-endo- $\alpha\beta$ -succinate into mice subcutaneously, and produced sarcomata. Subsequently it was noticed that mice grafted with this sarcoma showed a leucaemic state of the blood; as this was not observed until the fourth generation, and might have been due to a mouse of a leucaemic strain having been used, P. undertook further experiments to decide whether or not this leucaemic condition was connected with the chemically-produced sarcoma.

A series of nine sarcomata was produced in mice by subcutaneous injection of the same compound. In the treated mice there took place an increase in total leucocytes roughly proportional to the growth of the tumour, an increase in the numbers of myeloid cells, a rapid reversal of the normal relationship between polymorphs and lymphocytes, and an increase of size in the polymorphs associated with abnormal subdivision of the nucleus. Successive grafted generations from these tumours gave similar results; other effects were the enlargement and myeloid change of the spleen, infiltration round the portal tracts of the liver, cellular changes in the bone-marrow, and atrophy of the male genitalia.

The cell-free filtrate of the first of the sarcomata which P. produced by injection gave rise to a sarcoma at the site of injection in five mice; these sarcomata were markedly active and easily reproduced, giving the same clinical picture as the primary tumours and cellular grafts.

## NUTRITION IN RELATION TO DISEASE

CHAMBERS, W. H. (1938). **Undernutrition and Carbohydrate Metabolism.**—*Physiol. Rev.* **18**. 248-296. 4 tables. [Numerous refs.]

This is an extensive review of the literature dealing with carbohydrate metabolism in under-nutrition. An attempt has been made to correlate under-nutrition studies and endocrine research. The general conclusion arrived at is that experimental work in under-nutrition has modified the conceptions of the conditions regulating carbohydrate metabolism. The studies also emphasize the importance of the dietary supply of carbohydrate in the treatment of diseases involving deficient carbohydrate metabolism.—N. J. SCORGIE.

ROSS, I. C., CHAMBERLIN, W. E., & TURNER, Helen N. (1937). **The Influence of Improvement of Pastures and Rotational Grazing on Parasitism, Body Weight, and Fleece Production in Crossbred Sheep in Tasmania.**—*J. Coun. sci. industr. Res. Aust.* **10**. 313-326. 2 tables, 2 graphs. [2 refs.]

Three experiments are recorded. In the first, cross-bred lambs maintained on improved pasture at the rate of one sheep to  $\frac{2}{3}$  acre made significantly better gains in body weight, produced approximately 2 lb. more greasy fleece per head, more fleeces with a lower spinning count but of superior quality and handle, and fewer tender fleeces, than similar lambs maintained on natural pasture at the rate of one sheep to 1 $\frac{1}{2}$  acres. Sheep on natural or improved pastures made greater body weight gains and produced heavier fleeces when drenched monthly with carbon tetrachloride than when undrenched.

In the second experiment, lambs which failed to develop satisfactorily when weaned on to natural pasture did not make good this early failure when transferred to improved pasture during the second year of life.

In the third experiment, the beneficial effects on body weight, fleece production and parasitic infestation of monthly and weekly rotation of animals through four pastures, as compared with continuous grazing on similar pastures, was clearly demonstrated. Parasitism was characterized by a predominance of the smaller trichostrongyles with a lesser proportion of *Chabertia ovina*, and *Oesophagostomum venulosum*. *Haemonchus contortus*, though present, was unimportant.—H. B. C.

HAHN, P. F., & WHIPPLE, G. H. (1939). **Hemoglobin Production in Anaemia Limited by Low Protein Intake. Influence of Iron Intake, Protein Supplements and Fasting.**—*J. exp. Med.* **69**. 315-326. 4 tables. [7 refs.]

It has previously been shown that when the reserve store of iron in the body is removed, the production of new haemoglobin in dogs made anaemic by loss of blood is limited by the intake of iron in the food. The experiments here reported were designed to see whether the production of haemoglobin in anaemic dogs is similarly limited by the protein intake of the animal even if excess of iron is available. Anaemic dogs were kept on a low protein diet with a high iron content and the total circulating haemoglobin was estimated over periods of months. It was found that dogs on a low protein diet were unable to produce the usual amount of globin and consequently haemoglobin. When excess iron was given by the mouth or intravenously additional haemoglobin was not produced. The protein of salmon, banana and carrot was well utilized, 7-8 g. being required to produce 1 g. of haemoglobin. The experiments showed that the iron content of the liver is not wholly responsible for the potency of liver extract when given in anaemia due to haemorrhage.—A. T. PHILLIPSON.

JONES, J. H. (1938). **The Metabolism of Calcium and Phosphorus as Influenced by the Addition to the Diet of Salts of Metals which Form Insoluble Phosphates.**—*Amer. J. Physiol.* **124**. 230-237. 2 tables. [14 refs.]

Experiments with rats on a stock diet to which was added known concentrations of various salts of Al, Be and Sr (which form insoluble phosphates) produced marked rickets with an accompanying low serum P. Large doses of irradiated ergosterol (vitamin D) either prevented or cured the condition although normal calcification did not occur. The addition of these metals to the diet did not decrease the toxicity of large doses of irradiated ergosterol.—ALFRED EDEN.

UNDERWOOD, E. J. (1938). **Enzootic Marasmus: The Cobalt Content of Soils, Pastures and Animal Organs.**—*Aust. vet. J.* **14**. 183-189. 4 tables. [12 refs.]

Cobalt determinations on a number of soils and pastures from healthy areas and areas where sheep and cattle become affected with enzootic marasmus have been made. Similar observations have been made on the livers of "healthy" and affected sheep.

The mean cobalt content (air-dry basis) of surface soils from "affected" farms was 0.6 p.p.m.; of soils from adjacent healthy areas, 5.6 p.p.m., and of soils from distant healthy areas 10.4 p.p.m. That of "affected" pastures was 0.04 p.p.m. in dry matter, and of healthy pastures 0.16 p.p.m. Large increase in the cobalt content of typical "affected" pasture was obtained by top-dressing with cobalt acetate.

The mean cobalt content of livers from ten "affected" sheep was 0.06 p.p.m. and from healthy sheep 0.28 p.p.m. The results are considered to support the hypothesis that enzootic marasmus is due to a deficiency of cobalt in the diet.

—H. B. CARTER.

EVELETH, D. F., & MILLEN, T. W. (1939). **High Serum Magnesium Associated with Urinary Calculi in Sheep.**—*Vet. Med.* **34**. 106-107. 1 fig. [3 refs.]

A normal quantity of Ca (9.4-10.8 mg.%) and a high Mg content (5.6-6.5 mg.%) were found in the blood serum of two lambs which had shown symptoms of ruptured bladder. Nineteen lambs in the flock had died with this complication within 35 days as a result of urinary calculi. The chemical composition of the food upon which the flock had subsisted for the previous month was assumed to be that of the average of its kind and so to be relatively low in Ca and decidedly high in Mg. It was thought probable that the calculi resulted from an unbalanced mineral diet.

—G. WILLIAMSON.

LESAGE, J. (1938). **Au sujet de l'acide phosphorique du sol. [On the Phosphoric Acid of the Soil (Relation to Disease Resistance)].**—*Bull. Acad. vét. Fr.* **11**. 451-456.

L. claims that resistance to certain diseases is related to acid-soluble P in the soil. [The manner of presentation and evidence provided do not carry conviction concerning the particular claims made].

STEINER, M., ZUGER, B., & KRAMER, B. (1939). **Production of Renal Calculi in Guinea Pigs by Feeding them a Diet Deficient in Vitamin A.**—*Arch. Path.* **27**. 104-114. 4 figs. [Numerous refs.]

In 9 out of 35 g. pigs renal and ureteral calculi were produced by the feeding of a diet deficient in vitamin A; control g. pigs did not develop calculi. The sequence of histological changes observed in the urinary tract was hyperplasia, then metaplasia, and finally atrophy of the pelvic and ureteral mucosa. Large plaques of desquamated epithelium acted as foci for the development of calculi.

The calculi were formed mainly of calcium carbonate. There was no gross or histological evidence of infection in the urinary tract, but this was not tested by bacteriological methods. Similar histological changes were present in the trachea and lungs, and terminal pneumonia was a common sequel.—N. J. SCORGIE.

PETERS, R. A., & O'BRIEN, J. R. (1938). **The Vitamin B Group.**—*Ann. Rev. Biochem.* **7**. 305-324. 1 table. [Numerous refs.]

A review dealing with the vitamin B<sub>1</sub> and B<sub>2</sub> complex. Recent literature dealing with cocarboxylase (an ester of vitamin B<sub>1</sub>) and carbohydrate metabolism, chemistry and determination of vitamin B<sub>1</sub>, and the requirements of micro-organisms for vitamin B<sub>1</sub> is discussed. Reference is made to the still confused state of vitamin B<sub>2</sub> nomenclature, and to recent work on the requirements of monkeys, pigs, dogs and chicks under experimental conditions for the various factors of the B<sub>2</sub> complex.—N. J. SCORGIE.

KALAJA, L., & NÄRVÄNEN, R. (1938). **A Study of the Factors Which Cause the Heart Disturbances in Vitamin-B Deficiencies.**—*Skand. Arch. Physiol.* **79**. 303-312. 4 figs. [15 refs.] [In English].

The method of experiment adopted by the authors was to inject into rabbits, pigeons and rats such metabolic products as are known, or might be expected, to occur in the body in increased quantities during vitamin B<sub>1</sub>-deficiency. The function of the heart was followed by the electro-cardiograph. It was found that in rats large injections of lactic, pyruvic and  $\alpha$ -keto-glutamic acids and adenosine compounds caused a vagus-independent sinus bradycardia, similar to that of human beri-beri. In rabbits and pigeons, these substances had no distinct retarding effects on the heart, even when injected in large doses. On the basis of their data the authors conclude that the bradycardia occurring in rats in vitamin B<sub>1</sub>-deficiency is caused, at least in part, by an increase of the content of lactic, pyruvic and  $\alpha$ -keto-glutamic acids in the blood, and that these substances are not associated with the heart block in vitamin B<sub>1</sub>-deficient pigeons.—N. J. SCORGIE.

CHICK, Harriette, MACRAE, T. F., MARTIN, A. J. P., & MARTIN, C. J. (1938). **The Water-Soluble B-Vitamins other than Aneurin (Vitamin B<sub>1</sub>), Riboflavin and Nicotinic Acid Required by the Pig.**—*Biochem. J.* **32**. 2207-2224. 2 figs., 3 tables. [Numerous refs.]

Pigs were fed on a synthetic basal diet which allowed optimum growth when 4% of yeast was added to it. When the yeast was replaced by aneurin, riboflavin and nicotinic acid, growth ceased after 3-5 weeks, but on the addition of either the eluate or the filtrate fraction of Edgar and Macrae [(1937). *Biochem. J.* **31**. 886.], growth was continued at a third of its normal rate for 4-6 weeks, after which it again ceased. When both fractions were added, full growth proceeded for five weeks, after which there was a decreased rate of gain in weight, which corresponded to a relatively decreased appetite. Those pigs which were fed on the basal diet with aneurin, riboflavin and nicotinic acid plus the eluate fraction, developed a posterior paraplegia which was not cured when the filtrate fraction was added to the food. The pigs which received the same food supplemented by the filtrate instead of the eluate developed a microcytic anaemia and became increasingly subject to epileptic fits; both of these conditions disappeared, however, when the eluate fraction was also included as a supplement.

In addition to aneurin, nicotinic acid and probably riboflavin, the filtrate and eluate fractions of Edgar and Macrae are essential for the nutrition of the pig. It is probable that yeast contains still another essential which at present is unidentified.

—G. WILLIAMSON

SCHERMER, S., & DEPPE, K. (1938). Die Wirkung der Beifütterung eines D-vitaminreichen Futtermittels. (Trockenpräparat aus Weizenkeimlingen) unter verschiedenen Fütterungsbedingungen. [**The Action of Vitamin D Supplement (Vigantol) in Various Dietary Conditions**].—*Berl. Münch. tierärztl. Wschr.* Sept. 30th. 589-591. 1 table, 1 chart. [4 refs.]

It has previously been shown [*V. B.* 9. 501.] that feeding an unbalanced ration rich in acid foodstuffs will lower the alkali reserve of the blood and may produce symptoms of osteomalacia. The present work was done to find whether the administration of vitamin D would prevent the condition. Four experiments were carried out: 23 cows, 5 heifers and 12 pigs fed on rations including large amounts of silage, beet tops, etc., were examined, some being used as controls. The alkali reserve of the blood, the serum calcium and phosphorus, and the pH and ammonia contents of the urine were estimated before, during, and after the administration of vitamin D. The administration of vitamin D (vigantol) caused a rise in the alkali reserve of the blood, a slight rise in the pH of the urine, a decrease in the ammonia content of the urine, and a rise in the serum calcium and phosphorus. The change was most marked in those animals receiving the highest proportion of acid food. In the last experiment, cows, young heifers and pigs were examined in a similar way. The diet contained a lower proportion of acid food, and the variations in the estimations were within physiological limits. The authors conclude that feeding a vitamin D supplement will rectify the results of an unbalanced ration consisting of an excess of acid food.—A. T. PHILLIPSON.

GOOMAGHTIGH, N., & HANDOVSKY, H. (1938). **Effect of Vitamin D<sub>2</sub> (Calciferol) on the Dog**.—*Arch. Path.* 26. 1144-1182. 10 figs., 3 tables. [Num. refs.]

The authors made a study of the effects produced on the arterioles and kidneys of dogs by systematic dosage with calciferol. After describing the normal histology of the dog's kidney, they deal at some length with the physiological and histological changes arising as a result of excessive administration of calciferol. The investigation showed that daily doses of about 100γ per kg. body weight over a period of 100 days are beneficial to the health of normal adult dogs, in that hypertrophy of the arteriolar walls and stimulation of the thyroid and liver cells result. Doses of over 600γ per kg. cause regressive lesions, particularly in the renal arterioles, leading in 17-45 days to cell necrosis. The resulting symptoms are those of nephritis with uraemia. The changes in the arterioles are probably reversible provided they have not progressed too far. Arterioles of puppies and young dogs are more resistant to overdosage with calciferol, but here daily doses of over 600γ per kg. cause thymus regression and retarded growth. The significance of these observations is discussed with reference to human arteriosclerosis and Bright's disease.—N. J. SCORGIE.

## PUBLIC HEALTH

NARBUTAS, J. (1938). Pieno ir mesos sanitarine priežiūra kitose valstybese. [**Milk and Meat Hygiene in Certain Countries**].—*Vet. ir Zootech., Kovno* 15. 1-18.

N. visited dairy-farms and abattoirs in Berlin, Mannheim, Nuremberg, Munich, Salzburg, Vienna and Budapest, and describes their methods of milk and meat inspection.—A. PABIJANSKAS (KAUNAS).

SCHWERDT. (1939). Ist die elektrische Betäubung der Schlachttiere schmerzlos ? Beweis der Schmerzlosigkeit durch einen freiwilligen Versuch am Menschen in einer Fleischwarenfabrik erbracht. [**Electric Stunning of Slaughter Animals. Proof of its Painlessness by a Voluntary Test on a Man**].—*Berl. Münch. tierärztl. Wschr.* Jan. 20th. 44.

A German abattoir worker tested an electrical stunning apparatus on himself, applying the electrodes behind his ears. He was stunned for one minute and on recovery said that the stunning had been painless.—J. E.

STONE, R. V. (1938). **A Cultural Method for Classifying Staphylococci as of the "Food-Poisoning" Type**.—*Proc. Soc. exp. Biol. N.Y.* 33. 185-187. [10 refs.]

S. describes a method for the identification of food-poisoning staphylococci on beef extract plus gelatin medium. Enterotoxic strains produced liquefaction ; no liquefaction evidenced a non-enterotoxic strain.

CHAPMAN, G. H., LIEB, C. W., & CURCIO, Lillian G. (1937). **Isolation and Cultural Differentiation of Food-Poisoning Staphylococci**.—*Food Res., Ill.* 2. 849-867. 9 tables. [11 refs.]

The authors have elaborated tests for the isolation of food-poisoning staphylococci, based on tests for pigment, haemolysin and coagulase. Loss of any of these properties indicates degeneration of the strain ; haemolysis is the best test. Since STONE's claim [see above] that food-poisoning staphylococci could be differentiated from other species by their action on a special gelatin agar medium, was not confirmed by other workers, his method was reinvestigated. His reaction was found in 70.5% of typical food-poisoning staphylococci, in 27.6% of strains with similar cultural properties but isolated from other sources, and in 57.1% of food-poisoning strains which showed partial degeneration of the haemolytic property.

Stone's reaction should only be applied to variants which react positively to all the authors' tests. Degenerated strains may be lacking in the Stone's property. Food-poisoning staphylococci contain a combination of the gastro-enterotoxic factor with other properties common to staphylococci in general.—H. E. BYWATER.

## THERAPEUTICS

HARTLEY, P. (1939). **Biological Standardization of Therapeutic Substances**.—*Brit. med. J.* Feb. 4th. 240.

There are a large number of therapeutic substances of which the potency and purity cannot be adequately determined by chemical means, and biological methods have been devised for their standardization and assay. The group includes anti-toxins and antisera, diagnostic agents like tuberculin, insulin, pituitary preparations, the arsphenamines, the vitamins, the drugs affecting the heart, and the sex hormones. Standard biological methods are used to compare the activity of unknown preparations with that of a permanent standard.—J. M. ROBSON.

— (1939). **Discussion on the Use of Sulphanilamide and Allied Drugs in the Treatment of Human and Animal Diseases**. [Speakers : WHITBY, L. E. H., STABLEFORTH, A. W., RIMINGTON, C., LOEWENTHAL, H., FLEMING, A., & BEVAN, L. E. W.]—*Proc. R. Soc. Med.* 32. 849-858. 2 tables. [14 refs.]  
The various contributors to this discussion drew attention to the undoubted

value of the drugs of this group in certain bacterial diseases; and asserted that the blood concentration required is not the same in all infections. They admitted the lack of information regarding the blood concentrations required, and referred to the best methods of use, particularly with regard to the dose and intervals between doses. Large doses are considered necessary. The drugs are stated to have a toxic action on the erythropoietic and leucopoietic systems, and it may be possible to estimate the degree of this action by determining the quantity of porphyrins excreted in the urine. Dr STABLEFORTH stated that sulphanilamide acts on mastitis streptococci of group C. There is as yet no evidence concerning its action on the other groups or on *Brucella abortus* infection in farm animals.—W. J. IRNSIDE.

- I. MILLER, W. T., MINGLE, C. K., MURDOCK, F. M., & HEISHMAN, J. O. (1939). **The Concentration of Sulfanilamide in the Blood and Milk of Cattle and its Effect on *Brucella Abortus* and Streptococcal Infections of the Bovine Udder.**—*J. Amer. vet. med. Ass.* **94**. 161-171. 6 figs., 6 tables. [5 refs.]
- II. BAUER, H., & GUNDERSON, M. F. (1938). **The Estimation of Sulfanilamide in Milk.**—*Cornell Vet.* **28**. 299-304. 1 fig., 2 tables. [5 refs.]
- III. HOGE, W. G., HALVERSEN, W. V., & CHERRINGTON, V. A. (1939). **The Effect of Sulfanilamide Therapy upon Bovine Mastitis as Indicated by Laboratory Tests.**—*J. infect. Dis.* **64**. 27-35. [13 refs.]

I. The drug was either administered by stomach tube in a large quantity of water or given in the food. Given by stomach tube it was found that a concentration of 15 mg. in 100 c.c. of blood or milk could be produced by giving an initial dose of 0.4 g. per kg. body weight and that this level could be maintained by giving further doses of 0.15-0.2 g. per kg. body weight every 12 hours. In dry animals higher concentrations were reached in a shorter time than in animals in milk. When the drug was given in food two animals receiving 60 g. every 12 hours refused the seventh dose, while two receiving 90 g. refused the third dose. One of the treated animals was secreting *Br.a.* in the milk, one had streptococcal mastitis and a third was affected with both of the above conditions. In this third animal treatment was followed by complete clearing of the streptococcal infection, but the *Br.a.* infection in this animal and the infections in the other two animals remained unaltered.

II. The method of estimation described is based upon that given by FULLER [(1937). *Lancet*. **232**. 194-208.] for the examination of blood or urine. The method was tested on samples of milk containing known concentrations of the drug and on these samples estimations were made (a) immediately, (b) after storage in a refrigerator for 24 hours, and (c) after mixing the samples with trichloroacetic acid and storing for 24 hours. The range of error in all three cases was up to 4%.

III. The effect of sulphanilamide on the number of mastitis streptococci and of leucocytes present in milk is recorded, and some account is also given of the effect of the drug on mastitis streptococci and staphylococci *in vitro*. In the *in vivo* experiments the drug was given in gelatin capsules in doses ranging from 5-15 g. per 100 lb. body weight per day at intervals of 12 or 8 hours and for periods of about 10 days. A dose of 15 g. was not well tolerated and had to be reduced, but a concentration of 8 mg. per 100 c.c. of blood was obtained. It was found that streptococci disappeared while animals were under treatment but reappeared when treatment was stopped. The effect upon the number of leucocytes was found to be variable. Experiments on the *in vitro* effects showed that organisms were viable after a week's exposure to a concentration of 10 mg. per 100 c.c. of

milk, and that some remained alive where the concentration was 100 mg. per 100 c.c.—W. J. IRONSIDE.

DE, S. P., & BASU, U. P. (1938). **Synergy in Experimental Chemotherapy of Staphylococcal Infections.**—*Brit. med. J.* Sept. 10th. 564-565. 1 table. [5 refs.]

The subcutaneous injection of *p*-aminobenzenesulphonamide combined with an intraperitoneal injection of antiserum protected mice against a staphylococcal infection which proved fatal to controls. The drug or the serum alone afforded a protection which was far short of that produced by their combined action.—G. W.

HOLSTEIN, G., & RICHOU, R. (1938). Essais de traitement des staphylococcies cutanées du chien au moyen de l'anatoxine spécifique, seule ou associée à l'administration de dérivés sulfamidés azoïques ou non azoïques. [**Treatment of Cutaneous Staphylococcal Infection in Dogs with Specific Anatoxin, alone or together with Sulphamide Azo Compounds and Sulphamide Alone**].—*Bull. Acad. vét. Fr.* 11. 158-166. 1 table. [11 refs.]

The authors describe treatment with anatoxin of 15 dogs with cutaneous staphylococcal infection. The results, although good, were not always successful. It was found that dogs acquire and maintain natural and induced staphylococcal immunity with difficulty. There were indications that doses of sulphamide azo compounds or sulphamide itself aided the action of the anatoxin. No contra-indications were found. Details of dosage are given.—G. WILLIAMSON.

TASKIN, J. (1938). Traitement des complications nerveuses de la maladie de Carré, par l'hexaméthylène-tétramine (formine) et le dioxydiaminoarsénobenzène-méthylène-sulfonate de sodium. (sulfarsénol). [**Treatment of the Nervous Complications of Dog Distemper with Hexamethylenetetramine and Sodium Dioxydiaminoarsenobenzene Methylene Sulphonate (Sulpharsenol)**].—*Bull. Acad. vét. Fr.* 11. 490-494. 1 table.

The drugs were given simultaneously in 24 cases and alternately in 17. The results were good with both, and the one was as good as the other. The doses were:—every day or every second day, 1-2 mg. per kg. for sulpharsenol, and 33-66 mg. per kg. for hexamethylenetetramine.—G. WILLIAMSON.

LEVADITI, C., VAISMAN, A., & REINIE, L. (1938). La chimiothérapie antiendotoxique. [**Anti-Endotoxice Chemotherapy**].—*Ann. Inst. Pasteur.* 61. 635-661. 2 tables. [Numerous refs.]

In 1937 [*V. B.* 9. 423.] the authors obtained evidence suggesting that the curative action of sulphonamide compounds involved a neutralization of bacterial endotoxins. Further evidence supporting this has now been obtained, and it has been shown that the conclusion is of general validity and applies to the endotoxins produced by gonococci, meningococci, *Salmonella typhi-murium*, *Bact. flexneri*, *Bact. shigae*, and *Pasteurella aviseptica*. 4-nitro-4'-aminodiphenylsulphoxide is the most active anti-endotoxin drug tested. The anti-endotoxin and anti-bacterial activity of a drug are not always similar. The drugs do not affect the action of exotoxins (diphtheria, *Vibrio septique*, staphylococcus, snake venom, dysentery) and do not affect the action of the endotoxins when added to them *in vitro*. It is suggested that the drugs undergo some change in the body before they can exert their action.—J. M. ROBSON.

LLOVEROL, H. (1939). Le sérum normal de cynocéphale (*Papio papio*, Desm.) dans le traitement de la trypanosomiase expérimentale du mouton à *T. dimorphon*, Laveran et Mesnil. [**The Normal Serum of the Baboon (*Papio papio*) in the Treatment of Experimental Trypanosomiasis of Sheep Caused by *Tryp. congolense***].—*Bull. soc. Path. exot.* **32**. 328-334. [6 refs.]

Baboon serum was given intravenously in doses of 15-20 c.c. to five sheep infected with *Tryp. congolense*, three other sheep being kept as controls. Two of the treated sheep recovered after two or more serum injections, whilst all the control animals died from a progressive trypanosome cachexia. Of the other three treated sheep, two died after the disappearance of trypanosomes from the blood, and in one animal the baboon serum failed to cause a disappearance of trypanosomes.—U. F. RICHARDSON.

STEFFENS, M. (1937). Schafräudebehandlung mit "Räude-Derrisol"-Bengen. [**Treatment of Sheep Scab with Derrisol**].—*Dtsch. tierärztl. Wschr.* **45**. 653-654. 2 figs. [10 refs.]

Derrisol was found to be effective in an experiment on 15 Irak sheep, heavily infested with *Dermatocoptes*, *Melophagus ovinus*, and *Trichodectes sphaerocephalus*. The animals were dipped twice, at ten days' intervals, in a 5% "derrisol" solution with 2% of soft soap, at about 35°C. The solution should be prepared with water free from lime, and should be continually stirred during the treatment. Care should be taken lest the animals swallow any of the solution.

BERNARD. (1938). Behandlung von Wurmerkrankungen mit Arsinosolvin Bengen und Tartarus stibiatus. [**Treatment of Sclerostome and Ascarid Infestation with "Arsenosolvin" and Tartar Emetic**].—*Dtsch. tierärztl. Wschr.* **46**. 386-390. [17 refs.]

Treatment for horses consisted of intravenous injections of "arsenosolvin" followed by 10 g. of tartar emetic in watery solution *per os* on the following day, the whole being repeated three or four times at intervals of 5-14 days. It is stated that ascarids were expelled completely, but that in three horses out of ten the sclerostome eggs were still being excreted in significant numbers. In six horses which received "arsenosolvin" only there was no marked decrease of either ascarid or sclerostome eggs, but the condition of four of the horses improved. It is stated that "arsenosolvin" seems to act as a tonic and not as a vermifuge. Fourteen severely affected horses, some of which had oedema on the legs, improved after combined therapy, and ten of them increased in weight. The treatment described by RITCHERS and FRISCHBIER [(1930). *Berl. tierärztl. Wschr.* 493.] (tartar emetic intravenously and *per os*) is more effective in the control of sclerostomes.

—V. CHLÁDEK (PRAGUE).

BOLEY, L. E., LEVINE, N. D., & KAMMLADE, W. G. (1938). **A Note on the Effect of Repeated Treatment of Sheep for *Haemonchus contortus***.—*Cornell Vet.* **28**. 296-298. [8 refs.]

Eight ewes were given copper sulphate on each of four successive days and then at weekly intervals for seven weeks, and eggs of *H.c.* could be demonstrated in the faeces at the end of this period. One sheep died and the other animals were then divided and given different treatments, two being given copper sulphate, two carbon disulphide, two tetrachlorethylene and one nicotine sulphate. The treatments were given at weekly intervals for seven weeks. Autopsies made four weeks after the cessation of treatment revealed *H.c.* in all except those treated with tetrachlorethylene.—W. J. IRNSIDE.

KULIKOV, N. S., & TAMARIN, J. B. (1937). Opyty legenija diktiokauleza lošadej. [**Treatment of Dictyocaulosis of Horses**].—*Papers on Helminthology Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin*. pp. 302-304. Moscow: Lenin Acad. Agric. Sci.

The authors claim to have expelled *Dictyocaulus* from the lungs of seven horses by single intratracheal injections of aqueous iodine solution (iodine 0.1% + potassium iodide 0.2%), the dose being 250-300 c.c. The horses were rolled over on their sides and back during the injection. Three of the seven horses were killed and found free of the lungworms 7-10 days after treatment, and three untreated controls were found to harbour the parasites.

CARLSON, E. R. (1939). **Sheep Vermicide—A Stabilized Concentrate [Copper Sulphate and Nicotine Sulphate Solution]**.—*Vet. Med.* **34**. 48-49. 1 fig.

The concentrate is a 12% solution of copper sulphate and of nicotine sulphate and is rendered stable by the inclusion of 1.8% gum acacia.—W. J. IRONSIDE.

FOLLEY, S. J., & YOUNG, F. G. (1939). **The Effect of Continued Treatment with Anterior Pituitary Extracts on Milk Volume and Milk-Fat Production in the Lactating Cow**.—*Biochem. J.* **33**. 192-197. 5 figs. [7 refs.] [See also *V. B.* **9**. 345].

An increase in the milk yield and a very marked increase in the percentage of milk-fat followed the repeated injection of a prolactin preparation into cows in declining lactation. Similar treatment with a thyrotropic preparation produced no increase in the percentage of fat, but it did increase the milk output, though to a lesser degree. The yield of the cows receiving prolactin, after steadying at a high level, eventually declined in spite of continued treatment.—G. WILLIAMSON.

## POISONS AND POISONING

COUTURE, A. (1938). L'intoxication saturnine chez les animaux. [**Lead Poisoning in Animals**].—*Thesis, Alfort*. pp. 115. 1 table. [Numerous refs.]

A systematic treatise on plumbism as it affects each species of animal, describing the forms in which lead is encountered, mode of entry into the body, localization in the tissue and elimination, relative toxicity, clinical manifestation, morbid anatomy, diagnosis, prognosis, prophylaxis and treatment.

Figures of toxic doses cannot be given owing to wide variations in susceptibility, but lead salts in order of diminishing toxicity are:—lead tetra-ethyl, lead acetate, lead arsenate, litharge, metallic lead, lead sulphide and lead sulphate.

The appearance of punctate basophilia in the blood of animals with chronic plumbism is regarded as pathognomonic.—D. BAMFORD.

WEDEMANN, W. (1939). Fütterungsversuche mit Kokaoschalenmehl bei verschiedenen Haustieren. [**Feeding Trials on Various Domestic Animals with Cacao Nut Husk Meal**].—*Z. InfektKr. Haustiere.* **54**. 77-86. 2 tables. [16 refs.]

This experiment was conducted to see whether or not the theobromine content of cacao nut husk meal is harmless to stock. Young pigs, adult goats and hens were used. They were fed daily rations respectively of 10-20, 12-26, and 5-10 g. per kg. body weight cacao nut husk meal, containing 1.1-1.8% theobromine. The animals failed to increase in weight normally during the feeding trial, which lasted 50 days, although otherwise they appeared normal. W. concludes that

the meal, while not containing sufficient theobromine to cause pathological symptoms, cannot be considered an innocuous foodstuff.—A. T. PHILLIPSON.

HASSKÓ, A., & FÜLÖP, L. (1988). Beiträge zum Wirkungsmechanismus des Senfgases. [**Action of Mustard Gas**].—*Arch. wiss. prakt. Tierheilk.* **73**. 409-418. 5 figs. [8 refs.]

Mustard gas causes skin oedema within a short time in animals. The authors suggest that as histamine injected into the skin of human beings causes an exanthema resembling urticaria, a decomposition product similar to histamine might be the oedema-producing factor in mustard gas.

A few drops of liquid mustard gas were rubbed on to the inner surface of the ears of rabbits, and on to the backs of g. pigs. Blisters which formed on the rabbits' ears were drained, and the oedematous tissue was cut up and suspended in physiological saline, and the effect of the liquid and of histamine was tested on isolated small intestine from the same rabbit. The material from the mustard gas lesions caused an increase in the tone of the isolated intestine, and the nature of the reaction suggested that the substances concerned resembled histamine. Histamine caused a reaction at a dilution of 1 : 5,000. It was produced in the skin by action of the mustard gas and the amount varied according to the time which expired after the application of the gas, the greatest quantity being noted at 1½ hours. Mustard gas alone caused no contraction of the intestine.—SASSENHOFF (MUNICH).

- I. KING, R. O. C. (1937). **A Device Adopted for the Forced Feeding of Suspected Poison Plants at the Veterinary Research Station, Glenfield.**—*Vet. Res. Rep., Dep. Agric. N.S.W. 1937*. pp. 120-122. 1 fig.
- II. KING, R. O. C. (1937). **Verbesina encelioides (Crown Beard). A Plant Toxic to Sheep.**—*Ibid.* pp. 89-94.
- III. KING, R. O. C. (1937). **Chenopodium atriplicinum (Lamb's Tongue). A Plant Toxic for Sheep in the Immature Stages of Growth.**—*Ibid.* pp. 95-100. 1 table.
- IV. SEDDON, H. R., & KING, R. O. C. (1937). **Noogoora Burr (Xanthium chinense). Poisonous for Stock in Very Early Stage of Growth.**—*Ibid.* pp. 101-108. [6 refs.]
- V. HINDMARSH, W. L., & HART, L. (1937). **Castanospermum australe. (Black Bean, Moreton Bay Chestnut.) Green Seeds Poisonous to Stock.**—*Ibid.* pp. 109-114. 2 tables. [5 refs.]
- VI. HINDMARSH, W. L. (1937). **Cestrum nocturnum. A Plant Poisonous to Stock.**—*Ibid.* pp. 115-117. 1 table. [4 refs.]
- VII. HINDMARSH, W. L. (1937). **Salvia coccinea. A Garden Escape Poisonous to Stock.**—*Ibid.* pp. 118-119.

I. The device, which is fully described, is essentially a modified "balling" gun. It was designed to overcome the common difficulty of inducing animals to ingest sufficient quantities in feeding tests of plants suspected of toxic or harmful properties. It has apparently been used mainly with sheep. Using the gun, doses of two to four pounds can be given to a sheep and a dose of six pounds has been administered.

II. This plant was suspected to be toxic to sheep if eaten in sufficient quantity. The most constant lesions found on autopsy in suspected natural and in experimental cases consisted usually of excessive pleural exudate and patchy congestion of the lungs. More or less intense gastro-enteritis with accompanying toxic changes in the liver (acute central necrosis) and kidneys (acute parenchymatous nephritis) was noted but these were inconstant features.

III. The fresh immature stages of this plant were toxic for guinea pigs and sheep but not for cattle or pigs. The air-dried immature plant and the mature seeding stage were found to be less toxic than the fresh immature stage, or atoxic. The lesions induced experimentally correspond with those of suspected cases in the field and consist of gastro-enteritis involving the abomasum and small intestine, but not the large intestine, intense congestion of the brain, spinal cord and meninges, and congestion and necrotic changes in the liver and kidneys.

IV. The plant was toxic for pigs, sheep and cattle in the very young stages while cotyledons were still present. The lethal dose was 2% of the body weight for pigs, 1.8% for calves and a much higher percentage for sheep. A lethal dose caused death in twenty to forty-eight hours. The main lesions were those of a haemorrhagic gastro-enteritis, congestion and necrosis of internal organs, ascites and hydrothorax.

V. Large quantities of the ripe fruit (husk and seeds respectively) were fed to cattle and horses without ill-effect. Smaller amounts of the unripe seeds caused intense gastro-enteritis in cattle but appeared to be less toxic for horses. There was some evidence that the husks alone may cause gastro-enteritis.

VI. This plant, which was introduced to Australia as an ornamental shrub, has occasionally escaped from cultivation, but is only eaten by stock in exceptionally dry seasons. Symptoms observed during feeding experiments with cattle were depression and marked salivation. The main lesions were gastro-enteritis, and hepatic, renal and cerebro-spinal congestion.

VII. The result of a feeding test with a yearling steer supports the opinion held locally that the plant in the young stage is toxic for cattle. Symptoms were mainly those of extreme weakness and incoordination of movement. The main lesions observed were gastro-enteritis, slight congestion of liver and kidneys, and intense congestion of the meninges with submeningeal haemorrhage over the pons, and haemorrhage into the ventricles.—H. B. CARTER.

SAVICKIS, J. (1938). Chroninis arkliu apsinuodijimas paprastaisiais vikiais. [**Chronic Poisoning of Horses by Common Vetch**].—*Vet. ir Zootech., Kovno*. 15. 97-108. [German summary].

In 1937, poisoning of horses by vetch in fodder was observed in several districts in Lithuania. Acute and subacute forms of the condition appeared, working horses 8-12 years old being chiefly affected. The condition was characterized by restlessness, weakness of the hindquarters, yawning, loss of appetite, inability to drink, constipation, and difficulty in urination. The temperature was about 38.5°C., and rose further shortly before death; the pulse was accelerated, and breathing was difficult. The visible mucosae were icteric. Autopsy revealed brain hyperaemia, degeneration of the cardiac muscle, diffuse subendocardial haemorrhages, hepatic necrosis, and nephritis.

Inoculation experiments on rabbits excluded the possibility of epizootic encephalomyelitis.—A. PABIJANSKAS (KAUNAS).

ANGELOFF, S., & THOMOFF, Z. (1939). Erkrankungen der Rinder und Büffel nach Aufnahme von Eichenknospen und jungen Eichenblättern. [**Poisoning of Cattle and Buffaloes with Oak Buds and Leaves**].—*Dtsch. tierärztl. Wschr.* 47. 55-58. [6 refs.]

In the spring a wide-spread disease of cattle and buffaloes resembling haemorrhagic septicaemia was observed in many hilly parts of Bulgaria. It was found not to be infectious. The temperature of the affected animals was subnormal, there

was oedema of the lower parts of the body, haemorrhagic gastro-enteritis with infiltrations of the subserosa, and oedema of the lungs often followed by catarrhal pneumonia, the lymph nodes being moist but not inflamed. The first and constant symptom of the disease was albuminuria. The milk was bitter. The disease was due to poisoning by buds and young leaves of the oak tree. It is advisable not to graze cattle on pastures containing oak trees during the spring. Curative treatment was unsuccessful.—V. CHALDEK (PRAGUE).

## PHYSIOLOGY

POTHMANN, Emily. (1937). Der Eisengehalt der Milch verschiedener Haustiere. [**Iron-Content of Milk of Various Domestic Animals**].—*Inaug. Diss., Hanover*. pp. 20. 6 tables. [Numerous refs.]

Using a modified Lintzels method, 145 assays of the iron content of milk were made with the following results:—cows' milk, 0.507 mg. Fe per litre (32 assays, 9 cows); goats' milk, 0.454 mg. Fe per litre (15 assays, 5 goats); sheep's milk, 1.100 mg. Fe per litre (36 assays, 10 sheep); mares' milk, 0.688 mg. Fe per litre (24 assays, 7 mares); sows' milk, 1.105 mg. Fe per litre (24 assays, 9 sows), and bitches' milk, 4.108 mg. Fe per litre (4 assays, 1 bitch). The analysis was made at three stages in a lactation period and, except in the goats, the colostrum was also examined. The colostrum milk contained most Fe. The Fe content decreased from the first week of the lactation period and advanced again towards the end.

—G. WILLIAMSON.

MANN, T., & KEILIN, D. (1938). **Haemocuprein and Hepatocuprein, Copper-Protein Compounds of Blood and Liver in Mammals.**—*Proc. roy. Soc. Ser. B.* **126**. 303-315. 4 figs. on 1 plate. [Numerous refs.]

Details are given of a method of isolation of a blue copper-protein compound, haemocuprein, from the R.B.C. and serum of mammals. This compound has been obtained in a pure crystalline state from ox R.B.C., and in a highly purified and partly crystalline state from sheep and horse R.B.C. and from horse serum; the pure compound contains 14.35%N, 1.12%S and 0.34%Cu. Similarly, an almost colourless copper-protein compound, haematocuprein, also containing 0.34%Cu, has been isolated from ox liver. The two compounds have various properties in common, especially in not combining with oxygen [in contrast with the pigment haemocyanin of Mollusca and certain Crustacea analogous to haemoglobin but containing Cu in place of Fe in the molecule] and in not exhibiting any of the catalytic properties of enzymes. Their possible biological significance is discussed in relation to the known effects of Cu on blood formation, growth, and metabolism of organisms.—ALFRED EDEN.

HEWITT, L. F. (1938). **Serum Proteins in Normal and Pathological Conditions. I. The Blood Serum of Normal Animals. II. Human Blood Serum and Pathological Body Fluids. III. Horse Serum Studied by Means of the Precipitin Reaction.**—*Biochem. J.* **32**. 1540-1553. 1 fig., 12 tables. [Numerous refs.]

Attempts to separate serum into chemically distinct homogeneous individual proteins resulted in the detection of pseudoglobulin-A, globoglycoid, crystalbymin and seroglycoid in human, horse, ox and rabbit sera. Conditions were studied under which mixing of pseudoglobulin-A and globoglycoid produces a precipitate

of euglobulin II. In a nephritic patient the protein fractions were found similar whether derived from serum, urine, ascitic fluid or pleural effusion, and could not be distinguished from normal serum proteins. Specific precipitating sera were prepared for the four horse serum proteins, pseudoglobulin-A, globoglycoid, crystalbumin and seroglycoid. It is shown that the route and method of injection of crystalbumin have marked effects on the antigenicity. Approximate figures for the composition of normal horse serum in terms of four of the individual protein constituents were obtained by means of quantitative precipitin tests. The results were: pseudoglobulin-A, 2.6%; globoglycoid, 0.5%; crystalbumin, 1.9%; seroglycoid, 0.5%, and other proteins, 1.9%. In the serum of a horse immunized against diphtheria toxin the pseudoglobulin-A content increased three-fold and the crystalbumin content fell to half its normal value. After intraperitoneal injection of a rabbit with horse serum, the various horse serum protein fractions were detected by precipitin tests in the rabbit's blood stream within 15 minutes of the injection. The maximum concentration of foreign protein was reached after 1-4 hours, and fell very slowly, traces being still detectable after a fortnight's interval. Traces of horse serum pseudoglobulin-A and crystalbumin were detected in the cerebrospinal fluid of patients injected intravenously with horse serum.

—R. ALLCROFT.

ELLIS, M. (1938). **The Function of the Bronchial Tubes.**—*Lancet*. **234**. 819-825. 13 figs. [Numerous refs.]

By means of a special bronchoscope it has been shown that rhythmic changes of calibre synchronous with respiratory movements, occur in the bronchi of the dog. These movements are produced passively in response to the respiratory thoracic movements. The bronchial tubes were shown to be in a state of constant tone which could be modified reflexly from many sites. An indication of the possible relationship of attraction of the tone of the bronchi to spasmodic respiratory diseases is suggested.—R. N. C. AITKEN.

SILBERBERG, M., & SILBERBERG, Ruth. (1938). **Effects of Anterior Pituitary Implants and Extracts on Epiphyses and Joints of Immature Female Guinea Pigs.**—*Arch. Path.* **26**. 1208-1225. 5 figs., 5 tables. [12 refs.]

Histological examination of the knee joints and tibias of 136 immature female g. pigs treated either with anterior pituitary extracts or implants from cattle, showed that this portion of the organ contained one or more substances which exerted two main effects on the epiphysal cartilage, (1) a swelling of the chondromucoid matrix, followed by or associated with atrophy and degeneration of whole rows of cells in the epiphysal cartilage; in most cases these degenerations were associated with or followed by very extensive calcification: (2) hyperplasia and hypertrophy of the cells in the different layers of the epiphysal cartilage, the chondrocyte and the cartilaginous covering of the joint.

It is concluded that the growth of cartilage is probably a direct response to the stimulation exerted by a substance present in the anterior lobe of the pituitary gland, rather than a regenerative process caused by degenerative changes.

There was no evidence which indicated that the anterior lobes of pituitary glands of different kinds of cattle such as the steer, heifer, cow and bull, differed in its action on the cartilage.—R. ALLCROFT.

PIERRE, M. (1938). **Endocrinologie parathyroïdienne.** [**Parathyroid Endocrinology**].—*Rev. Méd. vét., Toulouse*. **90**. 657-679.

A review article in which P. deals with the parathyroids under the headings

anatomy, physiology, and physio-pathology. From all the experimental evidence he has studied, P. concludes that the initial factor involved in the tetany of parathyroidectomized animals is the retention of mineral phosphorus in the blood. This results from lowered urinary excretion of phosphorus, in explanation of which two theories are discussed, *viz* :—(1) lowered excretion of parathyroid hormone, with a resultant rise in the threshold of renal excretion, and (2) the catalytic function of the hormone, which leads to the formation of a complex soluble phosphorus-calcium salt which is rapidly eliminated in the urine. Hypocalcaemic symptoms (tetany, etc.) are only observed if the available calcium is insufficient for complete phosphorus elimination.

Dealing with the regulating mechanism of the parathyroids, P. regards the parathyroid-stimulating hormone secreted by the anterior pituitary as the principal factor. He develops the thesis that the various tetanies observed in animals (tetany of the young, and grass and lactation tetanies) are due to hypoparathyroidism arising as a result of insufficient secretion of the parathyroid-stimulating hormone. Hyperparathyroidism in human and veterinary medicine is briefly dealt with, reference being made to osteitis fibrosa in animals.—N. J. SCORGIE.

JOYNER, A. L. (1938). **A Study of the White Blood Cells of the Normal Guinea Pig.**—*Amer. J. Anat.* **62**. 497-506. 6 figs., 3 tables. [10 refs.]

J. carried out 388 counts on 232 g. pigs, using both the fixed smear method and the supravital technique. The neutrophile was the most numerous cell, and the count differed little from that of human blood. The lymphocyte was the next most numerous; supravital staining showed clearly that it was only this cell which contained Kurloff bodies, the benign cytoplasmic inclusion bodies always present in g. pig blood. In supravital preparations of g. pig blood, the granules of the basophile are larger than those in the eosinophile, whereas in other species the eosinophile contains larger granules than any other cell; the g. pig basophile is, however, clearly classified as such because of its metachromatic granule. Although the g. pig basophile is generally reported to be oxidase-negative, J. found that occasionally a basophile contained particles, in between the oxidase-negative granules, which exhibited a strong positive reaction to the peroxidase stain; this suggests that this cell possesses a hitherto unrecognized property. The article includes detailed tables; these show that a large range must be considered for all types of cell.

## TECHNIQUE AND APPARATUS

WILKS, R. A. C. (1938). **A New Decalcification Fluid.** [Correspondence].—*Nature, Lond.* **142**. 958-969.

The method consists of treating the tissues, after fixation, with aqueous solutions of sodium hexametaphosphate in strengths up to 80% of a neutral salt. The reaction involved is a simple replacement of Ca by Na, and complete decalcification of the highly calcified integuments of some of the Crustacea was effected in a day without any distortion. When applied to echinoderm and mollusc material, the process was equally successful but slightly slower. Mammalian bone was also softened but the penetration was much slower.—R. ALLCROFT.

HARDY, A. C. (1938). **Estimating Numbers Without Counting.** [Correspondence].—*Nature, Lond.* **142**. 255-256. 2 figs.

The method was devised to furnish rapid estimates, without counting, of the

numbers of some of the more important species of the marine plankton, but it is thought that it could be applied to the estimation of the seed production of plants or samples of small insects all of one species where an estimation within  $\pm 15\%$  of the actual numbers would be sufficient. A scale of dots is made and the dots so arranged that when a mask with a circular opening is placed over the scale, the number visible will increase by a definite amount as the mask is slid from left to right. From such a scale others can be made having, instead of dots, life-size photographic images of the objects to be estimated. Alongside is placed the sample, spread as evenly as possible, in a circular dish of the same size as the opening in the mask; the scale is turned to right or left until its number of images appears equal to that of the objects in the sample, and the number is read off from the scale.—R. ALLCROFT.

MUMFORD, P. B. (1939). **A Suggested Skin Protective.**—*Brit. med. J.* Feb. 11th. 266-267. [1 ref.]

A new protective agent for the skin named "HEB" is described. It consists of higher fatty alcohols (palmityl and stearyl), acid esters of these higher fatty alcohols, liquid paraffin, hard paraffin wax, water and perfume. The constitution of a similar "waterproof" preparation is the same but lanolin replaces the hard paraffin. Some of the disadvantages of the skin protectives now in use are discussed and the characteristics of the ideal protective agent are enumerated.—R. ALLCROFT.

KANTHER, H. (1937). Untersuchungen über Beziehungen zwischen Senkungsgeschwindigkeit der Erythrozyten und dem Verhalten des Albumin-Globulin-Gehaltes des Serums sowie der Sublimatprobe bei gesunden und kranken Pferden. [**Relation of the R.B.C. Sedimentation Rate to the Albumin:Globulin Ratio of Blood Serum and the Sublimate Test in Healthy and Diseased Horses**].—*Inaug. Diss., Hanover*. pp. 33. 4 tables. [Numerous refs.]

Sixty-one horses with various ailments were examined. In addition to the tests specified in the title, erythrocyte and leucocyte counts were made and the haemoglobin content of the blood was estimated. It was found that an increased R.B.C. sedimentation rate and a positive sublimate test occurred in 79% of cases. An increased rate of R.B.C. sedimentation and an albumin:globulin ratio of under 0.66 occurred in 60% of cases. Agreement between the sublimate test, the R.B.C. sedimentation rate and the albumin:globulin ratio was found in 34% of cases. It is difficult to evaluate the results given.—A. T. PHILLIPSON.

## MISCELLANEOUS

- I. —. (1938). **Report of the Committee on Legislation.** [U.S. Live Stock Sanit. Ass.]—*J. Amer. vet. med. Ass.* 92. 441-444.
- II. —. (1938). **Report of the Committee on Resolutions.** [U.S. Live Stock Sanit. Ass.]—*Ibid.* 470-472.
- III. —. (1938). **Report of the Committee on Policy.** [U.S. Live Stock Sanit. Ass.]—*Ibid.* 472-474.

I. Details are given of replies received from 37 States to a request for information regarding legislation affecting the live stock industry passed since December 1936. The recommendations of the committee were that the Association should

(a) file copies of all legislation relative to live stock passed in the U.S.A. and Canada, and (b) press for legislation to control the manufacture and sale of biological products containing live organisms or active virus.

II. Resolutions were submitted on :— (a) an investigation on trichinosis in swine in co-operation with live stock, sanitary and public health officials, (b) the maintenance of restriction against the introduction of contagious diseases of animals, (c) the provision of funds for a campaign against contagious abortion in cattle, and (d) the appointment of veterinarians to eradicate *Salmonella pullorum* infection under the National Poultry Improvement Plan.

III. This committee recommended that more attention should be paid to the questions of the control of dangerous livestock conditions and the prevention of disease in livestock ; they also suggest that a monthly report on disease conditions in the U.S.A. and neighbouring countries should be published. Another recommendation is that the U.S. Bureau of Animal Industry should form a division of vital statistics of live stock.—J. C. WALLACE.

TS'AI, V. (1936). **Animal Husbandry in China.**—*Insp. & Comm. J.*, Shanghai. 7. No. 10. 1-13. 2 figs., 6 tables.

An account is given of the need of animal labour in China at this period, the territorial distribution of domestic animals, the different methods of animal husbandry, and statistics of exports of animal products. Veterinary education and research, the distribution of disease, and the importance of animal disease prevention in China are also discussed. The number of trained veterinarians was small, only three schools being in existence. These were the Military Veterinary School at Peiping, the Department of Animal Husbandry and Veterinary Medicine of the National Central University, and the Veterinary School at Shanghai. There was need for 10,000 Chinese veterinarians. Production of sera and vaccines was progressing rapidly, five laboratories being engaged in this work ; two were under the control of the Ministry of Industry, one under the Health Administration, one under the Kwantung Provincial Government and one under the Kwangsi Government. Veterinary research was in a rudimentary stage because of the lack of veterinary education. Only one establishment, the Epizootic Prevention Service at Shanghai, was conducting research.—HUGH N. SPEARS.

## OFFICIAL AND OTHER REPORTS

CANADA, BRITISH COLUMBIA. (1937). **Report on Animal Diseases in 1936.**

[KNIGHT, A.]—*Rep. Dep. Agric. Can.*, 1936. pp. 56-59 and 61-63.

Under the heading nutrition and animal health in the report of the Live Stock Commissioner, the education of livestock owners in malnutrition due to vitamin and mineral deficiencies is dealt with. Progress is reported in warble-fly and tick control in the districts where work was undertaken.

Tuberculin testing formed the major portion of the work in the Veterinary Branch. The following diseases occurring in small sporadic outbreaks were also reported :—blackleg, haemorrhagic septicaemia, coccidiosis, keratitis, and foot-rot of sheep. Investigation of bovine haematuria, endemic in certain areas, has been undertaken by the Dominion Government.—L. M. HEATH.

AUSTRALIA, NEW SOUTH WALES. (1938). **Department of Agriculture. Veterinary Research Report No. 7, 1937.** [HINDMARSH, W. L.] pp. 125. 3 plates, numerous tables. [Numerous refs.] Sydney: Govt. Printer. [8vo].

In an introduction the Director of Veterinary Research discusses staff changes, diagnostic work (summarized in tables) and research work. Under the latter heading investigations into the following are noted:—swelled head in sheep, “yellows” or jaundice of sheep, nutritional anaemia of sheep, sheep blowfly, carbon tetrachloride poisoning in sheep, wool discolourations and fleece rot, plethoric toxæmia of lambs, contagious bovine pleuro-pneumonia, contagious bovine abortion, streptococcal mastitis, sterility in dairy cows, plant poisoning (*Eucalyptus corynocalyx* and *Heliotropium europæum*), pullorum disease of poultry, poisoning by ergotized paspalum, and deformity in calves.—H. McL. GORDON.

ITALY. (1938). *Relazione sulle attività della Stazione nel quinquennio 28 ottobre 1932-XI - 28 ottobre 1937-XVI.* [**Report of the Veterinary Research Institute of Sicily, 1932-1937.**] [MIRRI, A.]—*Azione vet.* 7. 293-322. 5 figs., 8 tables.

Much work was done on ANTHRAX, of which 43 outbreaks occurred during the five-year period 1933-1937. Obligatory vaccination at least once a year is carried out with the aid of a vaccine produced by the Institute since 1931, with which over 6,000,000 head of cattle in Sicily and elsewhere have been treated. Statistics show a decrease in the annual average of cases from 123 *per annum* from 1927 to 1931, to 47 cases *per annum* from 1932 to 1936.

BRUCELLOSIS is very common in goats and is sometimes also found in cattle and sheep. The goat infection is due solely to *Br. melitensis*. The results of a three-year investigation in two provinces into the infection in goats with the aid of Mirri's brucellin are given in a table. Positive reactors varied between 3.6% and 7.5%.

PULLORUM DISEASE is not widespread in Sicily although a few cases (13 in all) have been found in two localities. 93 cases of EPIZOOTIC LYMPHANGITIS were diagnosed. It is claimed that a preparation composed of 1 g. corrosive sublimate, 1 g. sodium chloride and 0.25 g. “subcutina” [details not given] in 100 c.c. of water cures 90% of cases after 4-7 injections.

124 cases of CONTAGIOUS AGALACTIA were diagnosed, 10% being joint and eye cases and 95-100% mammary cases. A fourth type called the “marasmatic” form is mentioned as occurring in young lambs and kids. It is thought that some cases of abortion may be due to this virus. It is suggested that the virus which can be cultivated may be merely a secondary invader, but that it has a special affinity for the real virus, the latter not being cultivable, and that in cultures the real virus gradually dies out. This would explain the loss in virulence of cultures. Work is being carried out in the hope of finding a curative agent. Stovarsol is ineffective.

A serum and a vaccine for the treatment of GAS GANGRENE have been produced, as well as vaccines for FOWL POX, FOWL CHOLERA and FOWL TYPHOID. Good results are claimed for the curative treatment of an outbreak of EQUINE INFLUENZA in 90 horses by arsenobenzol preparations; one animal died and the rest recovered.

Details are given of articles for farmers published in various journals, and also of scientific articles by the members of the institute staff that have been published.

CARDONA, L. (1988). Sul pubblico mattatoio di Asmara. [**Report of the Public Abattoir at Asmara, Eritrea, for 1937**].—*Azione vet.* 7. 90-94. 3 figs.

This is a survey of the work done at the abattoir at Asmara during the second half of 1937. The building is divided into two separate parts, one for Moslems and the other for Christians. The numbers of animals slaughtered were:—10,821 cattle, 2,748 calves, 9,630 goats and sheep, 9,851 lambs and kids, and 81 swine. 15 cattle, 8 calves and 2 sheep were rejected as unfit. The incidence of the diseases most often found were:—hepatic distomatosis 8%, echinococcosis 6% in liver and 2% in lungs, exudative pleuropneumonia 4% and cysticercosis 4%. Cases of tuberculosis, bovine "farcy" (streptothricosis), heartworm infestation and echinococcosis are described. 174 sheep and goats were tested with Mirri's brucellin and positive reactions were obtained in 2.24%. The better utilization of the by-products of slaughtering is discussed.

## BOOK REVIEWS

RUNNELLS, R. A. [D.V.M., M.S., Associate Professor of Veterinary Pathology, Iowa State College]. (1988). **Animal Pathology**. pp. xvi+464. 127 figs. [Numerous refs.] Ames, Iowa: Collegiate Press, Inc. [8vo] [\$6.00].

R. in his preface states that this book has been written principally as a text-book for the courses in general and special pathology which are given in most American veterinary colleges, and later states that it is written entirely from an American point of view, and does not deal with animal diseases which are not generally encountered in America. That such has been the case soon becomes apparent to anyone reading the book. Comparatively few references are given to other than American publications, almost all the illustrations are taken from the journals of the American Veterinary Medical Association and the nomenclature is that employed in the fourth edition of BERGEY'S *Manual of Determinative Bacteriology*.

Although a reviewer who is engaged in teaching these subjects in Great Britain is sorely tempted to refer to subjects which are either omitted or but cursorily treated, one feels that it would be unfair to do so at any length in view of the author's comments in the preface.

The book is divided into three parts. Part I deals with general pathology, and 184 pages are devoted to it; this is undoubtedly the best part of the book. Part II, consisting of 165 pages, deals with systemic pathology, and Part III, of 94 pages, concerns the special pathology of the infectious diseases. It should be mentioned that Parts II and III were included in the author's *Guide to the Study of Special Veterinary Pathology* [(1935). *V. B.* 5. 775.], but they have been extensively revised and rewritten for this book.

It is Part III which has given the reviewer the greatest disappointment. Whilst there is justification in a pathology text-book for excluding from consideration the characteristic features of the causal bacteria, in a section devoted to the pathology of the infectious diseases some detailed information is expected regarding the gross and microscopic changes to be found in these conditions. It is felt that even for students the matter has been over-condensed, and that much important information is lacking. For example the lesions in tuberculosis are dismissed in twelve lines, and tuberculous mastitis receives no particular mention. A few more photomicrographs would also be helpful to the reader.

This review cannot be ended, however, without a tribute to the excellence of many of the illustrations. Indeed the book as a whole has been well produced and is very attractive to read.—GWILYM O. DAVIES.

CHRISTOPHE, L. (1939). [Chargé de Cours à l'Université de Liège]. *La mort des brûlés. Etude expérimentale.* [**Death from Burns: Experimental Study**]. pp. 93. 9 plates, numerous tables and charts. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 40].

C. refers to the literature on burns, and quotes 205 cases with 40 deaths; 27 of these were due to primary shock in the first 24 hours, and 13 to secondary shock in one to three weeks without infection of the lesions. It is difficult to study the phenomena associated with early death owing to the rapidity with which they occur but C. believes that some light may be shed on this problem by a consideration of the causes of delayed death.

Part I reviews the theories that have been advanced to explain early death in burns. One of these is loss of function of the skin. Another concerns changes in the circulatory system. This might include thrombosis affecting the vessels of the cerebral cortex and large arteries; rapid concentration of the blood due to serum loss; heating of the blood, and disintegration of the red cells with blocking of the convoluted tubules of the kidneys. Nervous shock may also cause early death. When the burn is severe there is a rise in blood pressure followed by a fall amounting to collapse. The initial rise does not occur when the dorsal or cervical cord is severed, or when an animal is burned under deep narcosis. The phenomena have been attributed to changes in the medulla caused by the severe thermal injury. Another cause of early death is thought to be circulatory shock. This theory was based on the production of disintegrated albumin break-down products, or of a substance of the histamine type, since a parallel exists between traumatic and histamine shock; low blood pressure, capillary dilatation, and corpuscular concentration of the blood due to loss of serum are common to both.

Finally it was thought that toxic substances might be produced in the burned tissue.

Part II describes the author's work. He accepts the classical clinical picture as described by WILSON. When animals are so burned that death occurs after some days, the changes in the body fluids (*syndrome humoral*) are constant:—progressive anaemia, increasing albuminuria and the onset of nephritis, a fall in the total chlorides and nitrogen in the urine, increase in blood urea and non-protein nitrogen, a progressive increase in globulin and decrease in albumin (the inversion of the albumin:globulin ratio causing a lowered osmotic pressure), a fall in chlorides for all the elements, progressive falling of the reserve alkali and an increase in cholesterol in proportion to the gravity of the symptoms. The author found that amputation of a limb of which the whole of the skin had been burned, up to six hours after burning prevented death, but if it was delayed to the 12th hour death followed in 5-10 days. When perfusion of a burned graft was allowed to continue for ten hours the usual blood changes followed. He considers the phenomena associated with fatal cases to be due to a toxin which acts selectively on the brain, since such phenomena occur in a normal animal when the brain alone is perfused for six hours with the blood of a burned animal.

The author arrives at the general conclusion that during the first hours following a burn which is extensive, though not sufficiently severe to cause immediate death, a toxic principle circulates in the blood.

The toxin is considered to damage certain brain centres, notably in the anterior hypothalamus. The lesions give rise to physical and chemical modifications of the blood constants and to nephritis characterized by low blood chloride and high blood nitrogen.

The bibliography extends to 314 references, and a complete record of each of the 148 animals employed supports the text.—R. BAMFORD.

FISHER, R. A. [Sc.D., F.R.S., Galton Professor, University of London]. (1938).

**Statistical Methods for Research Workers.** pp. vi + 356. 12 figs., 72 tables.

[Numerous refs.] Edinburgh: Oliver & Boyd. [7th Edit.] [8vo] [15s.]

This book remains, and is likely to remain for many years, the classic of its kind. That seven editions have been published since 1925 is a fact which speaks for itself. The ordinary biologist, to whom it was originally addressed, may find it rather too advanced, and it is clear that its public now includes more than the ordinary research worker. No one will regard it as a book to be picked up and read lightly; nevertheless, for the most part it is not fundamentally difficult to understand.

One or two additions have been made to this edition and paragraph 49.2, with its example 46.2, is likely to prove of considerable value to the biological worker.

The book is too well established to need an extensive review. No higher praise of it can be given.—F. W. PRIESTLEY.

HOLMAN, L. J. [B.Sc. (Lond.)]. (1938). **Simplified Statistics.** pp. xi + 142. 12 figs., 7 tables. [15 refs.] London: Sir Isaac Pitman & Sons, Ltd. [8vo] [8s. 6d.]

The author has made an honest but not highly successful attempt to write a book on statistical methods that can be read like a novel. He has adopted the annoying manner, for which he has indirectly apologized in the foreword, of treating his reader as an intellectual inferior; one would imagine that this could have been avoided without in any way complicating the subject.

The subject matter is treated in an orthodox and almost stereotyped manner, going steadily from distributions, through estimates of error to correlation and probability. Little or no mention is made of the technique of dealing with small samples, a side of statistical methods which is of prime importance to biologists.

In short this book cannot conscientiously be recommended to research workers, to whom, incidentally, it is not primarily addressed. The research worker wanting an introduction to statistics will find that better primers have been written previously.—F. W. PRIESTLEY.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

---

Vol. 9.]

November, 1939.

[ No. 11.

---

DISEASES CAUSED BY BACTERIA AND FUNGI

- I. SANDERS, G. P. (1938). **Methods of Determining Chlorine in Milk and their Application in the Detection of Mastitis.**—*J. Dairy Sci.* **21**. 153-154.
- II. MEIGS, E. B., CONVERSE, H. T., BURKEY, L. A., ROGOSA, M., & SANDERS, G. P. (1938). **The Relation of Milking Machines to the Incidence of Mastitis.**—*Ibid.* 165-166.
- III. BURKEY, L. A., MEIGS, E. B., SANDERS, G. P., & ROGOSA, M. (1938). **Some Factors Affecting the Resistance of Animals to Mastitis.**—*Ibid.* 124-125.
- IV. CARLSON, E. R. (1939). **Potassium Permanganate Reduction Test for Mastitis.**—*Vet. Med.* **34**. 160-161.
- V. SMITH, F. R., & MUDGE, C. S. (1939). **Serological Studies on Mastitis.**—*Proc. Soc. exp. Biol., N.Y.* **40**. 45-48. 1 table. [6 refs.]

I. A method of determining the chlorine percentage in milk is described and is stated to be simple and accurate. Quarter samples (since bulk samples were unsatisfactory) from 29 cows through more than one lactation were examined, and are said to have shown that all values of over 0.15% indicated mastitis positive cows and that all over 0.12% were suspected or positive. (It is not stated whether bacterial tests were used to control the chemical tests).

II. A herd of hand-milked cows was divided into three. Some continued to be milked by hand and these remained normal as to milk yield, leucocytes, chlorides and bacteria. Of the other two divisions one was milked by machine using high pressures and stripped while the machine was still on; these showed a high leucocyte count within a few days followed by increase in chlorides, reduction of yield and appearance of bacteria, followed by acute mastitis. When hand-milked again these animals recovered. The other division was milked by the same machine but at a lower vacuum and stripped by hand. These did not suffer from acute mastitis though the leucocyte count and the chlorine were increased. It is argued that machine milking may cause injury to the secretory tissues of the udder.

III. The effect of the number of leucocytes in the milk, its germicidal properties and the inhibitory action of blood on *Streptococcus agalactiae* was studied. Increase in leucocytes indicates injury but not necessarily infection. The germicidal properties increase in direct relationship to the disease until the acute stage when they decrease. Blood serum inhibits the growth of *Str. agalactiae* in milk from the same cow but not in milk of another cow. This inhibition is not found in serum stored for four days or in serum from a cow suffering from acute mastitis.

IV. Potassium permanganate is used to indicate the increased reduction properties of abnormal milk. The test is performed by adding either 1 ml. of M/40 aqueous solution of potassium permanganate to 5 mls. of fore milk or 1 ml. of M/200 solution to 1 ml. of fore milk. A colour range relating to the various values is given.

V. Sera from cows in two herds were collected and tested for agglutinins and precipitins against a *Str. agalactiae* strain isolated from herd I. A large number of the cows in this herd reacted positively but no attempt was made to correlate these reactions with bacteriological examinations. The sera from herd II were uniformly negative.—P. S. WATTS.

LITTLE, R. B. (1938). **The Significance of Human Double Zone Beta Hemolytic Streptococci in the Udder of the Cow.**—*J. exp. Med.* **68**. 905-911. 2 tables, 2 charts. [10 refs.]

Human strains of double zone beta-haemolytic streptococci were introduced, *via* the teat canals, into the udders of 4 first-calved cows which were kept under good hygienic conditions, fed on a full milking ration and milked twice daily at evenly spaced intervals.

Mastitis was induced in 11 quarters. The infection persisted in 5 quarters whilst the other 6 quarters recovered from the infection at varying periods. This and comparative tests with bovine strains show that, while human strains can infect the udder, they do not persist like bovine strains.—H. E. BYWATER.

BROOKS, P. B. (1939). **Streptococcal Mastitis and Public Health.**—*J. Amer. vet. med. Ass.* **94**. 11-17. 2 figs.

A review of the existing knowledge concerning organisms responsible for milk-borne outbreaks of septic sore throat and scarlet fever.—H. E. BYWATER.

PETERSON, E. H., & HASTINGS, E. G. (1939). **A Study of the Possible Relationship Between Non-Specific Mastitis and Streptococcal Infection of the Bovine Udder.**—*Cornell Vet.* **29**. 11-24. 3 plates. [Numerous refs.]

The authors have dealt only with the chronic subclinical form of streptococcal mastitis. They emphasize the difficulty of transmitting chronic streptococcal udder infection to normal udders under natural conditions. They therefore suggest that chronic streptococcal mastitis is a product of two distinct agencies, namely the primary fibrotic lesions produced by a non-specific affection, and the complications brought about by the secondary invasion of the streptococci. Pathological findings which they record are considered to support this view.

Experiments on ten cows with abnormal udders showed that infection with streptococci was readily attained by means of small glass rods previously dipped into broth cultures and inserted up the teat canal. These infections gave every indication of being permanent.—R. ISHERWOOD.

STEWART, D. F. (1938). **Capsulation "Diffusion Factor" and Serological Behaviour of Group-B Streptococci (*Str. agalactiae*).**—*Aust. vet. J.* **14**. 180-183. [7 refs.]

Working with three strains of Group B streptococci (serological types 1d, 8c and 6a respectively) obtained from cases of bovine mastitis, S. found that some Group B strains produce a "diffusion factor", similar to that described by Duran-Reynals, for some streptococci and staphylococci. Using the capsule stain of Lyons some strains also appeared to be capsulated. He was unable to establish any correlation between capsulation and the production of a "diffusion factor",

or between capsulation and the serological behaviour of 45 strains tested by slide agglutination. He concludes that the apparent capsulation of Group B streptococci when examined by the method of Lyons is probably false. Previous attempts to demonstrate capsulation by Hiss's or Muir's methods had given entirely negative results.—T. S. GREGORY.

PATTO, O. (1938). Antitoxina e septicemia experimental estafilococicas. [**Choice of Antigens for Producing Staphylococcal Antitoxin**].—*Bol. Inst. Vital Brazil*. No. 20. pp. 17-20. 2 tables. [20 refs.] [English summary].

During the course of experiments with diphtheria antitoxin, P. compared the efficacy of the following antigens in experimental sheep:—(a) alum toxoid 1%, (b) tapioca toxin, (c) charcoal toxin 0.4% and Indian-ink toxin 1%, (d) emulsion of haemolytic staphylococci killed at 60°C., and (e) pure toxin. The alum toxoid was found to be superior to the others. Rabbits possessing natural antibodies were particularly resistant to artificial infection.—J. PASFIELD.

SUAREZ, E. H., & ARMIJO, E. R. (1936). Estudios sobre carbunclo. I.—La enfermedad experimental. [**Anthrax. I. Experimental Infection**].—*Rev. Inst. bact. Chile*. 5. No. 3/4. 3-16. 11 tables. [5 refs.] [English and French summaries].

Following a series of experiments on subcutaneous inoculation with anthrax culture, the authors conclude that the bacterial invasion has two phases. The first is due to the absorption of a number of bacilli which are destroyed by phagocytes. This gives rise to a transient septicaemia, enlargement of the spleen and liver, and an occasional positive reaction to the Ascoli test. The second phase sets in after 18-20 hours, and is brought about by the spreading of bacilli from the oedema at the site of infection. These bacilli are fully pathogenic, and attack with a virulence which overwhelms the cell defences and causes death. Septicaemia was demonstrated within 16-20 hours, and a precipitin, detected by the Ascoli reaction, appeared in strict parallelism with the course of the septicaemia. A second series of experiments, some by intraperitoneal and some by intravenous injection was carried out. Two groups of experimental animals were inoculated, one with culture, and the other with bacilli removed from a local lesion. The usual course was demonstrated in the first group. Death occurred, with the presence of oedema, within 25-30 hours. In the second group, death occurred within 12-14 hours, without oedema, septicaemia being present from the outset.

In the authors' opinion, anthrax culture has only potential pathogenicity; there is a period of about 16-18 hours in which mutation to full virulence takes place in the animal medium, preferably in the skin.

I. —. (1938). **Tuberculosis (Attested Herds) Scheme, 1938**. [Great Britain]. pp. 16. London: Ministry of Agriculture. [8vo].

II. —. (1938). **Tuberculosis (Attested Herds) Scheme, 1938**. [Great Britain]. **Explanatory Memorandum**. pp. 4. London: Ministry of Agriculture. [8vo].

III. —. (1938). **Ministry of Agriculture and Fisheries: Register of Attested Herds under the Tuberculosis (Attested Herds) Scheme [Great Britain]**. pp. 80. London: Ministry of Agriculture. [4to].

I. This scheme was made by the Minister of Agriculture and Fisheries in accordance with Section 20 of the Agriculture Act, 1937 [*V.B.* 8. 395.], to encourage the establishment in Great Britain of cattle herds officially certified

free from TB. Details are given of the conditions under which a certificate of attestation will be granted, continued in force, or revoked, and under which the Ministry of Agriculture will give financial assistance towards the cost of tuberculin tests. Two schedules indicate the rules to be observed; the first deals with those which apply after attestation, and the second with those applicable during the qualifying stages. Owners of attested herds receive either a bonus on milk sold or a *per capita* payment on all cattle in the herd.

II. The explanatory memorandum gives an outline of the scheme indicating its object and scope, the financial assistance available, the bonus payable after attestation and the rules to be observed.

III. This register, dated 30th June, 1938, gives a list of stockowners whose herds are attested under the Tuberculosis (Attested Herds) Scheme (Great Britain), together with particulars of distribution of such herds and a table of markets authorised for special sales of attested stock.—J. C. WALLACE.

FRANCKE, G., & PROFÉ, O. (1938). Zur Bekämpfung der Rindertuberkulose. [Control of TB. in Cattle].—*Tierärztl. Rdsch.* **44**. 565-571.

The serious loss due to TB. in Germany is emphasized, and stricter methods of control demanded. No new facts are reported.—P. S. WATTS.

SCHMIDT, H. W. (1938). Tuberkulose beim Reh. [Tuberculosis in the Roe Deer].—*Dtsch. tierärztl. Wschr.* **46**. 482-485.

P.M. examination of an 8-year-old roe deer dying of TB. showed that the disease was generalized throughout the body. The causal strain was identified as of the bovine type.—P. S. WATTS.

BACANU, C. (1938). Recherches sur la tuberculose congénitale du cobaye. Le passage du bacille de Koch à travers le placenta. [Congenital Tuberculosis in G. Pigs. Passage of Tubercle Bacilli Through the Placenta].—*C. R. Soc. Biol. Paris.* **129**. 1018-1020. [2 refs.]

Six female g. pigs in the third week of gestation and four in the seventh week were inoculated intravenously with 0.001 mg. of human tubercle bacilli, and the injections were repeated until all had aborted. The organs of the twelve still-born foetuses obtained from the first group were removed aseptically and the suspensions injected into 24 g. pigs. These later all gave positive tuberculin reactions but, at autopsy six months after inoculation, tubercle bacilli were recovered from only two, each of which had been injected with the organs of a foetus from a different female g. pig. The seven surviving progeny obtained from the second group of female g. pigs reacted positively to tuberculin, but at autopsy no tubercle bacilli could be recovered from the spleens, which were hypertrophied. B. concludes that the placenta is permeable to tubercle bacilli under certain conditions, especially when infection has occurred at an early stage of gestation, but that transmission takes place in the filtrable form, since no typical tuberculous lesions were found in either still-born or living foetuses.—R. O. MUIR.

PETRAGNANI, G. (1939). Nouvelles recherches sur la fréquence du bacille bovin dans la tuberculose humaine en Italie. [Incidence of Bovine Bacilli in Cases of Human Tuberculosis].—*Bull. Off. int. Hyg. publ.* **31**. 81-82.

The type of infection in 564 cases of human pulmonary TB. in a sanatorium at Rome was determined by culture on Petragnani's media and by g. pig and rabbit inoculation. Bovine type infection was thus diagnosed in 4 cases only.—J. E.

MOERKE, Georgine A. (1939). **An Enzyme of the Tubercle Bacillus.**—*Biochem. J.* **33**. 435-442. [10 refs.] [Author's summary copied *verbatim*].

Various experiments have been described wherein the human type of tubercle bacillus or a product of its growth was found to catalyse the oxidation of various phenolic substances. The properties of the active agent concerned in this catalysis, as observed under the conditions employed, suggest the formation of a diffusible, thermostable enzyme of the polyphenol oxidase type, whose behaviour is more consistent with catechol- than with phenol-oxidase, and which is not a tyrosinase. Part of the activity could be removed from a culture fluid of human type tubercle bacillus by use of a protein precipitant, and recovered from a solution of the washed protein. Methylene blue did not serve as a hydrogen acceptor for the oxidation of catechol catalysed by this enzyme.

CASON, J., & ANDERSON, R. J. (1938). **The Chemistry of the Lipids of Tubercle Bacilli. LVI. The Wax of the Bovine Tubercle Bacillus.**—*J. biol. Chem.* **126**. 527-541. 4 tables. [19 refs.] [Authors' summary copied *verbatim*].

The results of our investigation of the purified chloroform-soluble wax from the bovine type of the tubercle bacillus may be summarized as follows:

1. The composition of the wax is in general similar to the wax contained in the alcohol-ether extract of the human tubercle bacillus and which is obtained from the mother liquors in the purification of the phosphatide fraction.

2. The following types of compounds were obtained on saponification of the wax: (a) water-soluble constituents, glycerol and carbohydrate, (b) the ether-alcohol-insoluble Wax Acids I and II, (c) ether-alcohol-soluble fatty acids, and (d) neutral or unsaponifiable matter.

3. The carbohydrate is a complex mixture of organic phosphoric acids and a phosphorus-containing neutral polysaccharide. The neutral polysaccharide on hydrolysis yields (a) organic phosphoric acids, among which inosite monophosphoric acid is apparently present, (b) mannose, (c) inosite, and (d) an unidentified reducing sugar.

4. The ether-alcohol-soluble Wax Acid I represents a mixture of optically active acids with an average molecular weight of about 1,200, containing hydroxyl and methoxyl groups. The chief component is bovine mycolic acid which is very similar in its properties to mycolic acid obtained from the wax of the human tubercle bacillus. Bovine mycolic acid, when heated under reduced pressure to 250-300°, cracks and n-hexacosanoic acid distils off.

Wax Acid II represents a mixture of optically active acids having an average molecular weight of about 680 and containing hydroxyl and methoxyl groups.

5. The ether-alcohol-soluble fatty acids consisted of (1) solid saturated fatty acids which on fractionation yielded (a) palmitic acid and (b) a tetracosanoic acid of unknown constitution; (2) a small quantity of unsaturated fatty acids of high molecular weight but of unknown composition; (3) a new saturated optically inactive branched chain acid,  $C_{18}H_{36}O_2$ , isomeric with stearic acid; (4) a mixture of levorotatory acids having an average molecular weight of about 430 which could not be separated or identified.

6. The only ordinary fatty acid found among the ether-soluble constituents of the bovine tubercle bacillus wax was palmitic acid.

7. The neutral or unsaponifiable matter contained a crystalline dihydroxy monomethoxy alcohol,  $C_{25}H_{48}O_3$ , identical with phthiocerol, which has previously been found only in the waxes from the human tubercle bacillus. About one-half of the neutral material was a non-crystalline substance of unknown composition.

HENNINGER, E. (1937). Beobachtungen und Untersuchungen über Tularämie. [**Observations on Tularaemia**].—*Zbl. Bakt. I.* (Orig.). **140**. 105-109.

Experience shows that tularaemia in wild animals is often not noticed until the disease is diagnosed in man. Five cases of human tularaemia which occurred in Germany are described. One case was a laboratory infection involving H. himself, one a gamekeeper who became affected in the course of his duties, two cases were found by routine serological tests, and the fifth case was a person who had evidently contracted infection in the country whilst gathering berries.

For diagnosis a rapid agglutination test is of value and by its use evidence of infection can often be obtained in apparently healthy domestic animals and deer. It is suggested that blood sucking insects play a part in transmission of the infection.

—V. CHLÁDEK (PRAGUE).

DAVID, H. (1937). Zur Diagnose der Tularämie des Menschen und der Tiere. [**Diagnosis of Tularaemia in Man and Animals**].—*Zbl. Bakt. I.* (Orig.). **140**. 109-114. 2 figs., 1 table.

The fact that infected hares can be easily captured accounts for numerous infections in man. Affected hares may be in good condition and the clinical signs or lesions found P.M. are not suggestive exclusively of tularaemia. During the advanced stage of infection the spleen is enlarged, but it is not always easy to diagnose the disease directly in the hares. The simplest way to detect infection in hares is to inoculate g. pigs, which if infected, will die in 8-14 days and show characteristic lesions. The cultivation of *Pasteurella tularensis* from the blood and organs is uncertain, and antibodies are not regularly present in the blood. Mice are not suitable test animals. The g. pig inoculation test may sometimes fail, so direct cultivation is also advisable, on media with coagulated egg yolk, or on glucose-blood-cystein agar.

The agglutination test may be positive in cases of tularaemia in man eight days after infection, but some patients develop no agglutinins. D. states that brucellosis gives cross-agglutination of a non-specific character at low titres, but if it can be excluded, a titre of 1:20 for *P. tularensis* can be counted positive. Intra-dermal tests have been reported as satisfactory but the reactions are often very severe. Care must be taken to avoid infections while performing autopsies; rubber gloves should be worn and the mouth and eyes should be covered by a mask. Fly control is very important in laboratories.—V. CHLÁDEK (PRAGUE).

KUROSAWA, R., TATEZAWA, E., HIRATO, K., & KASAI, K. (1937). **Experimental Studies on Infectious Abortion in Mares. V. Cytological Observations of the Lochia.**—*J. Jap. Soc. vet. Sci.* **16**. 271-296 of pt. 1. 20 figs. on 5 plates, 5 tables. [9 refs.] [In Japanese: abst. from English summary pp. 82-85 of pt. 2].

Observations were made on the lochia in 18 cases of abortion in mares after experimental infection with *Salmonella abortus-equi*, in two natural cases of abortion associated with *S. abortus-equi* and a haemolytic streptococcus respectively and in 11 cases of normal parturition in mares.

Red blood corpuscles were abundant only in the red lochia after abortion, neutrophile leucocytes were abundant throughout the puerperium, eosinophiles were present in nearly all cases, large mononuclears were commonly seen in smears of yellow lochia, and lymphocytes were constantly present, being more numerous in the later part of the puerperium. Epithelial cells from the uterus were also abundant at the same period.

Lochia from cases of abortion was also rich in the causal organisms, which were often phagocytosed by the large mononuclear leucocytes.—J. E.

HIRATO, K., SOEKAWA, M., MIURA, S., & NAKANISHI, R. (1987). **Experimental Studies on Infectious Abortion in Mares. VI. Susceptibility of Geldings to Infection with *Salmonella abortus-equi*.**—*J. Jap. Soc. vet. Sci.* **16**. 445-464 of pt. 1. 7 tables. [5 refs.] [In Japanese: abst. from English summary pp. 59-62 of pt. 2].

From their experiments the authors conclude that it is highly probable that the virulence of *Salmonella abortus-equi* for healthy adult horses is very low and that the organisms do not multiply, but are rapidly eliminated from the tissues of inoculated animals without causing a true infection.

In geldings subjected to subcutaneous or intravenous inoculation the production of agglutinins began in four to five days and reached its maximum about ten days after inoculation. After intravenous inoculation O agglutinin was chiefly produced and H was produced in very small amounts or failed to appear, while after subcutaneous inoculation the production of H agglutinin was also marked and tended to approach that of O in amount.—J. G. MURRAY.

BAARS, G., & GLIESCH, R. (1939). Ergebnisse zehnjähriger Paratyphus-Enteritis-Untersuchungen in der Provinz Pommern. [**Results of Ten Years' Research on Paratyphoid Enteritis in Animals in Pomerania**].—*Tierärztl. Rdsch.* **45**. 267-271 and 289-294. 2 tables, 1 map. [Numerous refs.]

The authors state that during the ten years 1928-37 pathogenic bacteria were found in 1,222 of the 64,725 carcasses of various animals which were examined bacteriologically by the Meat Inspection Service in Pomerania. Of the organisms isolated, 88.8% belonged to the *S. enteritidis* group and 8.7% to the *S. typhimurium* group. The former were most frequent in the carcasses of calves and adult bovines (6.2% and 1.1% respectively), but since 1932 a marked tendency was observed towards a reduction in these figures, which is attributed to the successful control of paratyphoid enteritis in cattle in the province. However, the fact that pathogenic bacteria were found is considered by the authors to indicate the advisability of subjecting the carcasses of all animals slaughtered for meat to compulsory bacteriological examination. It is further stated that the examination of 200 herds of cattle showed that *S. enteritidis* may be excreted in the faeces of animals which have given a negative reaction to the agglutination test; such animals should be segregated as early as possible, since they may act as distributors of the disease.

HIPPMANN, W. (1938). Ein Fall vom Vorkommen des Bakt. suipestifer beim Rinde. [***Salmonella cholerae-suis* Infection in an Ox**].—*Z. Fleisch- u. Milchhyg.* **49**. 45-46. [6 refs.]

An ox with a slight swelling in the left stifle joint, and which was lame and had a rectal temperature of 102°F., was slaughtered. The bacteriological examination of the liver, spleen, kidney and a hepatic lymph node revealed the presence of *S. cholerae-suis*. All animals on the same premises were examined bacteriologically, but the results were negative.—A. W. MÖLLER.

SCRIVNER, L. H. (1939). ***Brucella Abortus* and Its Agglutinin in the Colostrum and Milk of Cows.**—*Thesis, Ithaca*. pp. 85. 20 tables. [Numerous refs.]

An account of investigations to determine (1) whether breaks in four previously *abortus*-free herds were due to residual infection of the udder in the absence of a blood titre, and (2) the extent to which the infection is established in the udders of vaccinated and unvaccinated cows. The latter investigations were confined to

an experimental herd of 28 vaccinated animals and 21 unvaccinated. The vaccinates were injected as calves with strain No. 19. The four previously negative herds contained a total of 179 animals.

Blood and milk agglutination tests, together with milk cultures and g. pig inoculations were used to determine the presence or absence of *Brucella abortus*.

S. was unable to demonstrate *Br.a.* in the milk of any animals in any of the four previously negative herds except when accompanied by a blood titre of diagnostic level.

In the vaccinated herd, S. concludes that vaccination probably prevented the udder from becoming permanently infected, although 5 of 28 vaccinated cows eliminated *Br.a.* in the colostrum at the time of first calving. Vaccination decreased the amount of *Br.a.* agglutinins produced and stored in the bovine udder previous to and at the time of parturition. Agglutinogenic factors became firmly established in the udders of 12 of 22 unvaccinated cows exposed to severe natural infection. Five of 28 vaccinated cows and 10 of 24 unvaccinated cows eliminated *Br.a.* in the colostrum at the time of first parturition, when the cows were continually exposed during gestation to virulent natural infection. Two of 28 vaccinated cows eliminated *Br.a.* in the colostrum or milk at calving time while the blood titre remained on a sub-diagnostic level. Strain 19 was not recovered from the colostrum or milk of any vaccinated cow.—HERBERT L. GILMAN.

GAMBERINI, P. (1938). La brucellosi in Romagna con particolare riguardo al comune di Ravenna. [*Animal Brucellosis in the Ravenna District, Romagna*].—*Nuova Vet.* 16. 263-268 and 293-295. 2 figs. [3 refs.]

G. urges more specific legislation against brucellosis, and suggests that provision be made for the compensation of owners. He gives the results of his examination of the blood of infected cattle (93 examined: 26 positive to Mirri's brucellin) and of sheep (1,181 examined: 583 positive to brucellin). He also examined the marrow of femurs of pigs (one positive for brucella out of eight examined), calves (12 positive out of 46) and a mule (positive), and samples of "ricotta" (a whey preparation), cheese and milk (all negative).—S. F. J. HODGMAN.

TOPACIO, T., & ACEVEDO, R. A. (1938). Infectious Abortion in Imported Dairy Cows.—*Philipp. J. anim. Indust.* 5. 479-488. 3 tables, 1 appendix. [7 refs.]

TOPACIO has recorded [*V. B.* 8. 347.] *Brucella suis* in outbreaks of the disease in swine outside the city of Manila. The disease appeared to have been introduced through imported breeding stock. In the present outbreak abortions had been reported in two dairy herds of imported cows, and on investigation the disease was proved to be due to *Br. abortus*.—J. A. GRIFFITHS.

FITCH, C. P., & BISHOP, Lucille M. (1938). The Wild Rat as a Host of *Brucella abortus*.—*Cornell Vet.* 28. 304-306. [3 refs.]

The authors isolated *Brucella abortus* from the spleen of one rat out of 66 examined; the rats were caught in a byre in which infected cattle were housed. They believe that rats feeding on infected foetal membranes may become infected, and refer to KARKADINOVSKY [*V. B.* 7. 61.] and to BOSWORTH [*V. B.* 9. 9.] who recorded *Br. abortus* infection in rats. Extermination of rats on *Br. abortus* infected farms is recommended as a control measure.—J. A. GRIFFITHS.

TIMONEY, J. F. (1938). "Observations on a Contagious Bovine Abortion Vaccine Experiment". Discussion on Mr. W. R. Kerr's Paper [*Vet. Rec.* 50. 717. (1938)].—*Vet. Rec.* 50. 1235-1245.

T. states that the immunity conferred by live vaccines is relative and breaks

down if the animals are exposed to heavy natural infection. It is possible that the vaccine enables the calf to be carried longer, but even so, in cows so treated abortion often occurs in later months of pregnancy. On the other hand natural infection confers a high degree of resistance, possibly due to premunition. In his opinion the absence of agglutinins from the blood does not indicate absence of the disease. A positive reaction to the agglutination test at a dilution of 1:8 indicates past exposure to the disease, and it is questionable if non-specific agglutinins exist. The vaccine used by KERR is discussed [V. B. 9. 373.] and a number of suggestions with regard to vaccination and to the agglutination test are made.

—P. S. WATTS.

HAMANN, E. E., & HUDDLESON, I. F. (1939). **Studies of an Atypical Strain of *Brucella Abortus* Isolated from a Naturally Infected Animal.**—*Vet. Med.* **34**. 282-288. 4 tables. [1 ref.]

Unsuccessful attempts had been made for 30 months to eradicate infection from a herd of cattle, 11 herd agglutination tests having been done. During the last 12 months of the period two double vaccinations with an intermediate R strain had been given. An atypical strain was isolated from a cow after the above vaccination.

It was apparently a normal S strain, which in g. pigs gave rise to only a very low agglutination titre; a few animals showed macroscopic lesions in the liver and spleen, but none of these lesions was extensive. The authors conclude that infection with this strain had existed in the herd, causing detection to be difficult.

—C. V. WATKINS.

PAGNINI, U. (1937). Ricerche e considerazioni sulla "panna montata" in vendita nelle latterie di Torino, con particolare riguardo alla presenza in essa di germi del genere *Brucella* e del microbatterio tubercolare. [**Presence of Tubercle Bacilli and *Brucella* in Whipped Cream Sold in Turin**].—*Ann. Igiene (sper.)*. **47**. 213-226. [Numerous refs.]

The incidence of undulant fever in the province of Turin led P. to study its source, and whipped cream was incriminated. Out of 38 samples examined by g. pig inoculation, 23 were shown to contain *Br.a.* *Br.m.* was found in 2, and TB. in 14.

MARSH, H., & TUNNICLIFF, E. A. (1938). **Dysentery of New-Born Lambs.**—*Bull. Mont. agric. Exp. Sta.* No. 361. pp. 42. 12 tables. [Numerous refs.]

Most cases occur between 20-36 hours after birth; very few occur after 48 hours. Hyperaemia or severe congestion of the alimentary canal and enlargement of the mesenteric lymph nodes were the only gross lesions found. The outbreaks all occurred in lambing sheds, usually when cold wet weather prevailed, although, experimentally, cold sanitary conditions alone did not give rise to outbreaks, unless faeces from affected animals were spread on the ground.

Experimental results indicated that the disease was not due to a specific pathogenic organism, but to environmental conditions which favoured the development of normal but potentially pathogenic intestinal bacteria. The bacteria involved were found to be species of *Escherichia coli* [the authors' nomenclature is used throughout this abstract] and sometimes *Clostridium welchii* (Type 2 Simonds), which were also present in normal lambs. The feeding of 5.25 c.c. of intestinal contents from dysentery cases caused death in more than 50% of cases. Control feeding of contents from normal lambs in three cases caused death. *Cl.w.* was present in most normal and infected lambs. Of 181 strains from dysentery cases

only one produced a strong toxin. This strain appears to be identical with *Cl. ovi-toxicum* [*Cl.w.* Type D]. *Cl.w.* Type B, as found in England, is certainly not involved. The immunization of ewes with formolized whole culture of both B and D types did not lower the incidence of dysentery in lambs in field cases.

Large numbers of strains of "*E. coli*" from the intestine (and body tissues when present) of normal and infected lambs were isolated and identified. Of these, "*Escherichia communior*" appears the most important. The feeding of 50 c.c. of the latter or of "*E. pseudocoloides*" caused death in about 88% of cases. Smaller doses did not produce infection and such large doses could not occur in natural infections. Strains from normal lambs produced nearly as high a mortality. The maximum virulence of the *coli* culture was not developed until after 40 hours' incubation.

Immunization of lambs with antiserum to the *Escherichia* showed a slight protective action in field and experimental cases, but did not control the disease in natural outbreaks. The early administration of internal antiseptics such as phenol sulphionate or acriflavine reduced the deaths to some extent.—S. F. BARNETT.

DESKOWITZ, M. W. (1937). **Bacterial Variation as Studied in Certain Unstable Variants.**—*J. Bact.* 33. 849-867. 4 figs., 6 tables. [Numerous refs.]

Fifteen unstable colonial variants of *Salmonella typhi-murium* were obtained by allowing a broth culture to age at 37°C. for several weeks and plating out on agar. The percentage of R and S colonies on plates streaked with R colonies during successive daily subculture remained constant and predictable within certain limits. Four tables show the effect of ageing, incubation at lowered temperature, various chemicals, pH and subculture in broth, on the ability of unstable colonies to yield stable and unstable colonies. The mechanism of unstable variation and its relationship to ordinary dissociation is discussed, and the conclusion is reached that bacterial variation, like recurrent gene mutation in higher forms, is due to an inherent property of bacterial protoplasm, independent of environment, and that ordinary dissociation possibly differs only quantitatively from unstable variation.

—R. O. MUIR.

STERNE, M. (1938). **Variation in the Colony Form of the Anthrax Bacillus.**—*Onderstepoort J. vet. Sci.* 10. 245-250. 2 tables. [11 refs.]

A study was made of uncapsulated avirulent variants from two virulent strains of *B. anthracis*. It was found that these variants possessed a complex dissociation pattern and that there was a tendency for sporogenous types to produce asporogenous variants. Two highly unstable phantom variants were obtained which continuously gave rise to rough non-phantom daughter strains, which in their turn showed further dissociation. All the variations encountered appeared to be of the continuous type and this study bears out the suggestion by DESKOWITZ [see preceding abstract] that the difference between unstable variation and ordinary variation is only quantitative.

BOVIN, A., & MESROBEANU, Lydia. (1938). Les antigènes somatiques et flagellaires des bactéries. [**Somatic and Flagellar Antigens of Bacteria**].—*Rapp. 1er Congr. int. Ass. Microbiol. Langue franç., 1938.* pp. 5-57. 1 table. [Numerous refs.] [Also appeared in *Ann. Inst. Pasteur.* 61. 426-478].

A review article which does not lend itself to abstraction. It deals chiefly with the antigenic structure of pneumococci, streptococci and salmonella organisms, and briefly with the nature of exotoxins. The chemical and biological properties of "antigène-complet" and its relation to O antigen are discussed. Vi antigen

probably has a chemical constitution which is similar to that of O antigen. The properties of the H antigen in salmonella and clostridial organisms are discussed. Anyone interested in this subject, particularly from the chemical aspect, should consult the original article.—JOHN FRANCIS.

BROWN, H. C. (1938). **Some Observations on the Electric Charge of Micro-Organisms.**—*Sci. J. R. Coll. Sci.* 8. 52-57. 3 figs.

A cell for the study of microcataphoresis and a method of estimating the electric charge on particles is described. When haemolytic immune body is injected into an animal it destroys the red corpuscles, this destruction being preceded by a lowering of the negative charge of the red cells. Intravenous administration of potassium ferrocyanide by increasing the negative charge of the corpuscles protects mice from the effect of haemolytic immune body. Immune serum reduces the negative charge on bacteria and white corpuscles, thus aiding phagocytosis. Potassium ferrocyanide prevents this.

The charge on the developmental and cultural forms of *T. melophagium*, *T. lewisi* and *T. cruzi* was found to be negative, though the charge of the blood forms varied. When a relapse occurs in mice after spontaneous recovery a reversal of the sign of the charge invariably occurs. Passage from animal to animal in the same species does not change the character of the charge, but passage to a more resistant animal does so. Positively charged variants of *T. evansi* are more susceptible to the action of tryparsamide than the negatively charged variants.

—J. FRANCIS.

## DISEASES CAUSED BY PROTOZOAN PARASITES

MAZZA, S., & GUERRINI, F. Z. (1936). Comprobación de un nuevo caso de forma aguda benigna de enfermedad de Chagas y de un cachorro portador de *S. cruzi* en Añatuya, Santiago del Estero. [**A Case of Chagas' Disease**].—*9th Reun. Soc. argent. Pat. reg. N.* 1. 517-521. 1 fig.

*Trypanosoma cruzi* was demonstrated in blood taken from a three-month-old puppy living in a house in which human cases occurred.

MAZZA, S. (1936). Efectos de la transmisión experimental de *Trypanosoma equinum* (Voges) en armadillos y zorros. [**Transmission of Tryp. equinum to Armadillos and Foxes**].—*8th Reun. Soc. argent. Pat. reg. N.* 2. 1007-1009. 1 fig. [2 refs.]

M. states that armadillos and foxes are susceptible to *Tryp. equinum* infection. A healthy armadillo of the Dasypodida family, injected with *Tryp. equinum*, died after six days, and trypanosomes were demonstrated in the blood. Of two artificially infected foxes, one died 98 days after infection, and trypanosomes were present in the blood. The second died 120 days after infection, trypanosomes being demonstrable in its blood only from the 12th to the 60th days and none P.M. Blood taken from the living animal 68 days after infection, however, proved virulent.

- I. STABLER, R. M. (1938). *Trichomonas gallinae* (Rivolta, 1878) The Correct Name for the Flagellate in the Mouth, Crop and Liver of the Pigeon.—*J. Parasit.* 24. 558-554.
- II. FLORENT, A. (1938). La trichomoniasis du pigeon. [**Pigeon Trichomoniasis**].—*Ann. Méd. vét.* 83. 401-428. 6 figs. on 2 plates. [11 refs.]

III. CAILLEAU, R. (1989). L'acide ascorbique, facteur de croissance pour le flagellé *Trichomonas columbae*. [**Ascorbic Acid as Growth Factor for *T.c.***].—*C. R. Soc. Biol. Paris*. **130**. 819-821. [6 refs.]

I. A review of the literature on the *Trichomonas* from the upper digestive tract and liver of the pigeon reveals much confusion regarding its correct name. Since only one flagellate has actually been described from these sites, the names, *Cercomonas gallinae*, *C. hepaticum*, and *T. columbae* of various authors thus become synonyms of *Trichomonas gallinae*.

II. Infection of the pigeon by *T. columbae* [*T. gallinae* according to STABLER in I] is by direct ingestion or indirectly by contamination of the drinking water. Chickens are resistant. Young pigeons are first attacked in the course of an outbreak, but later older birds may succumb. Longevity of the flagellates in culture varies with the media and nature of contaminating bacteria. The virulence varies enormously and many pigeons may be carriers of saprophytic strains.

Lesions occur in the beak, oesophagus, intestine, liver, pancreas and lungs; diagnosis is based on the detection of the parasites in the depths of the necrotic ulcers in the mouth, or in the faeces. They can be isolated from the blood, spleen, and bone-marrow after death. A detailed description of the macroscopic and microscopic pathology is given, and the symptomatology is described. Differential diagnosis is discussed. Treatment is symptomatic or sometimes surgical. Disinfection of the water supply is important in control.

III. *T.c.* [see note in II] would not multiply beyond the first passage in broth to which pigeon serum free of ascorbic acid was added, but reached 7 passages after the addition of ascorbic acid.

It could be grown in broth plus calf liver which had been kept for 14 months, provided that ascorbic acid and cholesterol were added to the medium.—M. L. B.

HINSHAW, W. R., McNEIL, E., & KOFOID, C. A. (1938). **The Relationship of *Hexamita* sp. to an Enteritis of Turkey Poults.**—*Cornell Vet.* **28**. 281-293. 2 tables. [11 refs.]

Enteritis in turkey poults in California, sometimes designated "trichomoniasis", is due, in the opinion of the authors, to the flagellate *Hexamita* (= *Hexamitus* = *Octomitus*), which is recorded by others from tortoises, frogs, pigeons and trout with enteritis. Field studies included 1-10 visits to over 40 ranches, autopsies, and experimental work on turkey poults. There was striking similarity between the results of the field studies and the experimental results. Experiments with *Hexamita* alone and with almost every combination of *Hexamita* and the other protozoa present (*Chilomastix*, *Trichomonas*, and *Amoeba*) proved that *Hexamita* alone was a possible cause of the enteritis, although bacteria and viruses were not excluded. *Trichomonas* was often the most abundant of these organisms. Coccidia were not sufficiently numerous or frequent enough to have caused the disease. In the duodenum and jejunum *Hexamita* only was found. In the caecum one species of *Hexamita*, two species of *Trichomonas* and *Amoeba* and one species of *Chilomastix* were found. *Hexamita* was also consistently found in the bursa fabricii, and might be present there even in birds only eight months old or in birds as old as two years. An interesting comparison is made between the bionomics and pathogenic effects of *Hexamita* and *Giardia*.

The disease may cause 20-90% mortality, especially in young poults 1-9 weeks old, among which mortality is highest in those aged 3-5 weeks, while older birds suffer less. The annual loss from the disease in California alone may be \$100,000. The symptoms are listlessness, droopy wings, seeking for more warmth, stilted gait, with droppings foamy or watery, or both, and there is rapid emaciation, although

the birds feed normally. Survivors remain stunted and under weight, and most birds exposed to infection remain carriers. Autopsy revealed catarrhal enteritis chiefly of the duodenum and jejunum, with watery contents and bulbous distensions. The caeca showed nothing more than congestion around the ileo-caecal opening. Oedema of the tissues, ascites and "foaminess over the mesentery" may be present.—G. LAPAGE.

HART, L. (1938). **Eimeria Tenella Infection in Chickens Eight Days Old.** — *Aust. vet. J.* **14**. 74

Previous reported outbreaks of coccidiosis in domestic fowls in New South Wales have been due to *Eimeria tenella*. The greatest losses have generally been among chickens from 3-10 weeks old. H. reports an outbreak in which there were heavy losses among chickens aged 4-8 days. A footnote adds that *E. necatrix* infection had been recently seen by the author in adult fowls in New South Wales.

—T. S. GREGORY.

BLOOM, W., & TALIAFERRO, W. H. (1938). **Regeneration of the Malarial Spleen in the Canary after Infarction and after Burning.**—*J. infect. Dis.* **63**. 54-69. 14 figs. on 5 plates. [18 refs.] [Abst. from authors' summary].

Infarcts of varying sizes occur sporadically in the spleens of canaries heavily infected with *P. cathemerium*. They are essentially haemorrhagic in character and are associated with propagating thrombi in the splenic veins which generally extend from the capsule towards the hilum. They probably result from the malarial infection, as all attempts to associate them with bacteria, viruses or intra-venous injections of India ink have failed.

Practically all such infarcts become completely regenerated, as ascertained by laparotomy and by microscopic examination of tissues. The histological repair process is described in detail.

The same type of complete splenic regeneration follows experimental burning of a tip of the spleen except that the speed of regeneration is slower, due probably to the loss of the capsule, and there is a greater exudation of heterophiles during early inflammation and of eosinophiles during late inflammation and repair.

STAUBER, L. A. (1939). **Factors Influencing the Asexual Periodicity of Avian Malaras.**—*J. Parasit.* **25**. 95-116. 7 figs., 1 table. [Numerous refs.] [Author's summary copied *verbatim*].

1. A study of the experimental modification of the asexual periodicity of avian malaria was conducted on three strains of *P. cathemerium* ("C", "D" and "N") and on one strain of *P. relictum* var. *matutinum* ("R"). One of the strains ("N") was obtained by single-parasite isolation.

2. The synchronous periodicity of reproduction of avian malaria is affected by alternate 12-hour periods of high and low temperature.

3. It is affected by light itself—active through the eyes and not through the body surface—if of sufficient intensity to cause the host to be active.

4. As a corollary to (2), it is associated with rest or sleep which seem to be important orienting factors.

5. It is not affected by host feeding of the type devised in these experiments.

6. It is considered possible that the host may furnish a set of critical temperature conditions which orients the time of segmentation. In such an hypothesis, the period of rest becomes important in that it makes possible the temperature differential necessary for the appearance of the critical value.

CAVALLETTI, S. (1938). Sulla piroplasmosi dei suini. [**Piroplasmosis in Pigs**].—*Nuova Vet.* 16. 114-115. 1 fig.

C. gives an account of an outbreak of porcine piroplasmosis in Perugia in 1936. He noted the presence of *Rhipicephalus sanguineus* on the animals; he describes the symptoms and the appearance of the piroplasms. Curative treatment with Bayer acaprin gave good results. White pigs were more liable to attack than the local black breed.—S. J. HODGMAN.

SHIRLAW, J. F. (1938). On the Relationship between "Lahore Canine Fever" and "Tiek Fever" of Dogs due to *P. gibsoni* Infection, with Observations on their Pathology and Haemocytochemistry.—*Indian J. vet. Sci.* 8. 293-316. 6 figs. on 4 plates, 7 charts. [6 refs.]

Attention is drawn to the high mortality occurring in imported and other well-bred dogs in the Punjab from "Lahore canine fever", and it is suggested that the disease occurs throughout India, and may also occur in Burma, Ceylon and Assam. Probably few imported dogs escape infection, and the mortality in their offspring is extremely high, while native animals have little susceptibility and probably act as reservoirs of infection. The disease is most prevalent in the season of tick activity, and it was thought it might be a piroplasmosis, but early attempts to transmit it by blood inoculation were a failure. This is explained by the later experience that *Babesia gibsoni* is not regularly transmissible by blood inoculation, and that many of the pariah dogs used in experiments are not susceptible. The findings of previous workers that salmonella might have an aetiological connexion with the disease are considered unconvincing.

The disease sets in suddenly with high fever, evidence of acute abdominal pain and the occasional vomiting of bile-stained fluid. A thin serous discharge from the nose may be present, and when accompanied by high fever and increased difficulty of respiration may lead to a suspicion of pneumonia. Little remission of temperature occurs till the fifth or seventh day, when it may drop temporarily to nearly normal. This remission of temperature may be accompanied by a transient diarrhoea and an inflammation of the gums. The temporary remission of fever is followed by an abrupt rise to about 106°F. and then fluctuates between 103-105°F. for several days. If the dog survives this period there is a second partial remission of fever with occasional paroxysmal rises. This stage is characterized by increasing anaemia and cardiac involvement, but the animal may appear brighter. The prognosis is invariably bad and, without warning, the temperature may again rise to 104-106°F., to be followed by pneumonia or a sudden fatal haemorrhage from the nose or intestines.

At the onset of the disease there is a marked leucocytosis, but the erythrocytes are normal in size and the haemoglobin content of the blood is normal. Later, large mononucleated histiocytes make their appearance. After about two weeks the haemoglobin percentage declines, and the red blood cell count may fall eventually to two million per c.mm.

In some cases with this syndrome *B. gibsoni* makes a rare appearance in the blood, where it can only be detected on alleviation of the fever.

At autopsy the spleen is found to be enlarged up to ten times its normal size, and is dark red or even chocolate in colour; the liver is also grossly enlarged, cirrhotic, studded with petechiae and frequently bile-stained. Systemic lymph nodes are swollen and haemorrhagic, and the gastro-intestinal mucous membrane shows petechiae and sometimes areas of ulceration.

A description is given of the histopathology of the spleen, liver and bone-marrow, the most important observation being the detection of granules appearing

in well defined clusters in the cytoplasm of polyblasts and reticular cells of the spleen and bone-marrow. These granules stain intensely with Heidenhain's iron haematoxylin but indeterminately by Romanowsky stains. Attempts were made to set up *B. gibsoni* infection in pariah dog puppies by the inoculation of citrated blood or saline suspension of spleen and bone-marrow. It is stated that all of 16 puppies were infected in time and charts are given of the reaction in seven cases. The febrile reaction resembled that described for "Lahore canine fever" but was not always so severe. P.M. the enlargement of the spleen and liver was found, even in cases in which the fever reaction had not been severe. The granules of the reticular cells of the spleen and liver were also detected in all cases. *B. gibsoni* appeared in the blood of animals infected by inoculation, but was usually only detectable for a few days, and its appearance in the blood was often delayed for one or two months after inoculation.—U. F. RICHARDSON.

VAN VOLKENBERG, H. L. (1989). **Observations of Anaplasmosis as It Occurs in Puerto Rico.**—*Vet. Med.* **34**. 234-236.

*Anaplasma marginale* has been found by the author to be the cause of the anaplasmosis which occurs in Puerto Rico, chiefly among cattle over 30 months old. *Babesia bigemina* and *Babesia argentina* are also said to cause disease in that country; he did not observe *Anaplasma centrale*. The cattle ticks are *Boophilus annulatus* and *B. australis*. The tropical horse tick *Dermacentor nitens* and the brown dog tick *Rhipicephalus sanguineus* also occur. Only one tabanid *Chrysops variegata* is common; other species are rare. The native cattle are very resistant to the tick-borne diseases; dairy cattle of improved breeds raised on the island also develop a resistance to tick fever, except with regard to anaplasmosis. Dairy cattle imported from the United States are very susceptible to anaplasmosis and relapses occur frequently.—J. A. GRIFFITHS.

- I. SCHWETZ, J. (1934). Sur la présence de certaines inclusions globulaires dans le sang des cobayes et leur ressemblance avec certaines formes de *Bartonella muris rattii*. [The Occurrence of Inclusion Bodies in the Blood of Guinea Pigs, and Their Resemblance to *Bartonella*].—*Bull. Soc. Path. exot.* **27**. 515-522. 2 figs. [6 refs.]
- II. WEINMAN, D., & PINKERTON, H. (1938). **A *Bartonella* of the Guinea-Pig, *Bartonella tyzzeri* sp. nov.**—*Ann. trop. Med. Parasit.* **32**. 215-224. 3 figs. on 1 plate. [Numerous refs.]

I. S. reviews the literature on the transmissibility of the bartonella of rodents to pigs, and points out that KLEIN *et al.* [(1930). *Arch. Schiffs. u. Tropenhyg.* **34**. 274.], who reported successful transmission and also the existence of a latent infection of g. pigs detectable by splenectomy, were only able to detect rare rod forms, the majority of the erythrocyte inclusions being coccoid. Work on this problem in the Congo showed that coccoid inclusions, and occasional rod forms, could be detected in almost all g. pigs, though splenectomy or infection with trypanosomes might make them more numerous. WENYON and LOW (1914.) confirmed that similar inclusions could be detected in the blood of g. pigs born and bred in England, and that these bodies are indistinguishable from the so-called *Paraplasma flavigenum* of SEIDELIN which, it was claimed, appeared in the blood of g. pigs inoculated from cases of yellow fever. It is concluded that these inclusions are not proved to be *Bartonella*, and it is suggested that they may be nuclear remnants.

II. The authors record the detection of a true bartonellosis of g. pigs in Peru, in the area where human infection with *B. bacilliformis* and canine infection with *B. canis* occurs. They discuss previous records of bartonella infection in g. pigs and accept the view of SCHWETZ [see I, p. 763.] that the inclusions described were probably nuclear remnants. G. pigs are not susceptible to inoculation with either the human or canine species of *Bartonella*, but are readily infected with the g. pig organism, which is therefore considered a distinct species, and named *B. tyzzeri*.

The organism occurs as single or composite rods,  $1.5\mu$  to  $4\mu$  in length, and sometimes as cocci. On staining with Giemsa, no differentiation between nucleus and cytoplasm is evident, the organisms staining an intense red-violet. Only about one erythrocyte per thousand was invaded, and no serious disease resulted from infection. The organism grew readily in Noguchi's semi-solid medium, the cultures resembling those of *B. bacilliformis*.—U. F. RICHARDSON.

WEINMAN, D. (1938). **On the Cause of the Anemia in the Bartonella Infection of Rats.**—*J. infect. Dis.* **63**. 1-9. 1 fig., 4 tables. [Numerous refs.] [Abst. from author's summary].

The parasite *Bartonella muris* appears to be the direct cause of erythrocytolysis and thus of haemoglobin liberation, since:—(a) it is present within or attached to red cells when lysis occurs; (b) when no parasites are visible there is no demonstrable lysis; (c) fragmented red cells are frequently encountered and the cell remnants contain parasites, and (d) the more fragile and achromic of the red cells are those containing parasites.

VAN DER WALLE, N. (1938). Recherches sur l'existence d'infections à leptospires chez les chiens à Anvers. [**Leptospira Infections of Dogs in Antwerp**].—*C. R. Soc. Biol. Paris*. **128**. 804-806. 1 table. [3 refs.]

The incidence of infection with *L. icterohaemorrhagiae* or with *L. canicola* was investigated in 100 dogs slaughtered at the town pound for various reasons. No spirochaetes could be found in the urine, and inoculation of kidney material into g. pigs also gave negative results. Cultures of *L. canicola* were obtained from kidney material. Their virulence was very low. Agglutination and lysis reactions of the serum of all the dogs showed that 50% of dogs between 3-6 years and 66% of all dogs of 7 years or more were infected with one spirochaete or with both, but that the infection was very slight. Males were more often infected than females.

KRESTAN, W. (1936). Spirochätennachweis aus Organen (durchgeführt mit Geflügelspirochäten und Leptospiren). [**Detection of Fowl Spirochaetes and Leptospira by Examination of Organs**].—*Wien. tierärztl. Mschr.* **23**. 569.

It is not always possible to demonstrate spirochaetes in the blood and organs of infected animals. The most suitable method in K's opinion, is histological examination using Levaditi's silver staining method. If the organs are pulped and emulsified at a concentration of 1:10 in physiological saline, the emulsion filtered through a coarse filter, and the filtrate centrifuged, leptospira in the sediment may be revealed by dark-ground illumination. This enrichment technique is only applicable to living leptospira, as dead organisms decompose during centrifugation.—V. CHLÁDEK (PRAGUE).

## DISEASES CAUSED BY VIRUSES

STANLEY, W. M. (1988). **Virus Proteins—a New Group of Macromolecules.**—*J. phys. Chem.* **42**. 55-70. 1 fig., 4 graphs. [Copied *verbatim* from *Rev. appl. Mycol.* **17**. 407].

This is an interesting survey of recent advances in the study of virus proteins, with special reference to their inclusion in the field of colloid chemistry as a new group of macromolecules. Several virus proteins, some from plant and others from animal and bacterial diseases, some larger and some smaller than the relatively immense tobacco mosaic virus protein, have been isolated and are undergoing investigation in various laboratories. Since the virus proteins possess the reproductive capacity and other properties characteristic of living organisms, as well as molecular features, any attempt at the present juncture to relegate them to one or other of these groups would be premature pending further experimental data.

TRAUB, E. (1989). Ueber Immunität und aktive Immunisierung gegen Viruskrankheiten. [**Immunity and Active Immunization against Virus Diseases**].—*Z. InfektKr. Haustiere.* **54**. 169-218. [Numerous refs.]

Although the neutralization of virus *in vitro* is well known, we are still ignorant of details of immunization against virus *in vivo*. It is unlikely that this neutralization acts only on the surface of the virus molecules. The complement-fixation test is rarely of value for the diagnosis of virus diseases, but its possible value should be studied in diseases which are difficult to diagnose, such as equine infectious anaemia. The precipitin and agglutination tests behave with elementary bodies—in the virus diseases in which they occur—in the same way as with bacteria. Leucocytes apparently play no important part in the development of immunity. The presence of active virus in the blood is evidently not essential to the development of immunity, since with certain exceptions immunization may be carried out with inactive virus. Virus carriers which are infective for a long time are rare.

The danger of active immunization is that the treated animals may spread infection. The method must therefore only be used when the circumstances really warrant the risk of this contingency. Simultaneous inoculation of virus and specific serum is the best method but does not prevent the spread of the disease. The cheapest and most effective method is to use virus, provided the inoculation does not result in numerous losses or a spread of the disease. Development of a suitable immunity depends in many cases on local reactions after inoculation. The immunity conferred by virus inactivated by chemical or physical means is not as a rule sufficiently effective by itself but this method, followed by administration of active virus, is a useful combination in heavily infected areas. Trials recently made with the virus of foot and mouth disease to combine adsorption of the virus with inactivation by formalin may lead to the discovery of a more effective method which might have general application.

Recently work has been carried out on the concentration and purification of virus. American workers have been successful in developing virus fractions of extraordinary virulence, by using the ultracentrifuge. The production of concentrated virus is very expensive however, and a further disadvantage is the lability of virus protein. Isolated virus, being in the stage of multiplication, is in many ways different from intracellular virus. [This valuable review should be read in its original form—Ed.]—V. CHLÁDEK (PRAGUE).

LÉPINE, P. (1939). Ultravirus et immunité. [**Ultraviruses and Immunity**].—*IV Congr. int. Pat. comp.*, 1939. 1. 19-44. [Numerous refs.] [In French : English, German, Italian and Spanish summaries]. [Abst. from author's summary].

Modern research has not yet solved the problem of acquired immunity (after infection or vaccination) in ultravirus diseases. The demonstration of viricidal action in the body fluids of recovered or vaccinated men or animals, and analogies with immunity in bacterial infections, have given rise to the humoral theory of immunity in ultravirus diseases. This theory does not explain all observed facts. Some virus infections produce little or no antibody, although they leave a strong immunity. If antiviral bodies are formed, they do not always show a parallelism with the course of immunity, which may persist for a considerable time after humoral antibodies have disappeared.

The cellular theory of immunity explains the resistance by a change in the specific sensitive cells, *i.e.* without any antibody function. This theory, however, does not explain everything. Probably immunity consists of a combination of these mechanisms, the change in cell responsivity being the *primum movens* in the change of defensive processes and the production of humoral antibodies contributing to the sterilization of the organism. In plants, immunity is obtained either by means of elimination of the diseased tissues or by means of a process of premunition (the defensive action of a weak virus against a strong one).

The study of immunity includes also the question of the persistence of the virus in the organism after recovery or after vaccination, and the question of the physical condition, whether living or dead, of a virus used as a vaccine. The heterogeneous nature of antigens and of body reactions may explain the different experimental results obtained.

Recent advances in physicochemical research on virus proteins may provide the solution of several immunity problems.

LÜHRs. (1938). Was kostet die Maul- und Klauenseuche? [**Economic Loss Due to Foot and Mouth Disease**].—*Berl. tierärztl. Wschr.* May 13th. 277-279.

The loss of meat due to the recent outbreak of F. & M. disease in Oldenburg was estimated at about one and a half million marks, and that of milk at about 582,000 marks. In addition the losses amounted to 1·8 million marks in cattle, 117,000 in swine and 62,000 in sheep. The losses from this disease in Oldenburg was estimated as follows:—9·7 million marks in 1911, 4·2 millions in 1915, 7·9 millions in 1920 and 10·2 millions in 1926.—HANS GRAF (ZÜRICH).

ZINTEL, J. (1938). Kampanie przeciwpryszczycowe na Huculsczyźnie. [**The Campaigns against Foot and Mouth Disease in the Huzul Country**].—*Przegl. wet.* 53. 91-106. 3 figs., 1 table.

The mountainous south-east frontier of Poland required special measures against F. & M. disease in the years 1932-1937. It was necessary to appoint a special staff of veterinarians to inspect, with the aid of the police, all alpine pastures and the cattle kept thereon. Free veterinary service was given and there was supervision of frontier traffic. During the period dealt with, the ears of the cattle were marked for purposes of identification. Despite the very difficult circumstances, F. & M. disease was only imported on one occasion, and was quickly stamped out.—V. CHLÁDEK (PRAGUE).

GRÄUB, E. (1938). Die Maul- und Klauenseuche vom epidemiologischen Standpunkt aus betrachtet. [**Foot and Mouth Disease from the Epidemiological Viewpoint**].—*Schweiz. Arch. Tierheilk.* 80. 524-530.

In emergency G. inoculates cattle with doses of 100 c.c. of blood taken from an adult bovine at the height of the infection and in which the virus has been killed by the addition of crystal violet. It is stated that this confers immunity against the disease in a freshly-infected herd and greatly reduces the severity in animals which have been artificially infected with saliva of infected animals.

G. is of the opinion that serum-virus inoculation is the best method of dealing with an outbreak of F. & M. disease.—A. W. MÖLLER.

COHRS, P., & WEBER-SPRINGE, W. (1939). Maul- und Klauenseuche beim Reh und Hirsch. [**Foot and Mouth Disease in Roe Deer and Red Deer**].—*Dtsch. tierärztl. Wschr.* 47. 97-103. 7 figs. [8 refs.]

A doe was found dead in July, 1938 and there were ulcers in the mouth and on the coronets. Ulcers were also present on the mucosa of the rumen and there were several disseminated myocardial necrotic foci. Tests for the presence of the virus and of specific bacteria yielded negative results. In August a second case occurred in a shot roe deer in which there was ulceration of the coronets of both forelegs, probably complicated by secondary infection in the course of F. & M. disease. In October examination of both forelegs of a stag revealed an exungulation of the medial claws. Aphthae were found under the horn of the apparently sound claws.

The danger of the spread of F. & M. disease by deer in European conditions does not seem very great, although they may spread it mechanically without actually developing the disease. Sick and lame deer should be shot and carefully examined for F. & M. disease. [Diagnosis in these cases was based solely on the appearance of the lesions].—V. CHLÁDEK (PRAGUE).

HAAN, & MAAS. (1939). Die aktive Immunisierung gegen Maul- und Klauenseuche mit Riemser MKS.-Vakzine nach Waldmann und Köbe. [**Active Immunization against Foot and Mouth Disease with Waldmann and Köbe's Riems Vaccine**].—*Berl. Münch. tierärztl. Wschr.* March 17th. 165-175. 3 tables, 2 graphs. [6 refs.]

A supplement to an earlier report [*V. B.* 9. 84]. Up to November, 1938 a total of 89,702 cattle, 4,972 sheep and 2,687 goats had been vaccinated against O virus, some with bovine virus vaccine, some with culture virus vaccine and a few with a mixture of these two. Experience showed that these vaccines were innocuous to the animals and that immunity was effective within five days after injections in the case of bovine virus vaccine and somewhat later in the case of culture virus vaccine. Although cases of F. & M. disease occurred in vaccinated animals within 10 days, hardly any occurred after this interval and 95% of the animals proved to be immune against contact infection up to the maximum period of observation,—8-9 months. [For details of the vaccinations in the various districts, the original must be consulted as the results are given in part schematically].—J. E.

I. OLITSKY, P. K., & HARFORD, C. G. (1938). **Intraperitoneal and Intracerebral Routes in Serum Protection Tests with the Virus of Equine Encephalomyelitis. I. A Comparison of the Two Routes in Protection Tests.**—*J. exp. Med.* 68. 178-189. 6 tables. [Numerous refs.]

- II. RECORDS, E. (1988). **Infectious Equine Encephalomyelitis and its Biological Treatment.**—*Vet. Med.* 83. 201-208. 1 fig. [12 refs.]
- III. LYON, B. M., & WYCKOFF, R. W. G. (1988). **Chick Vaccine for Equine Encephalomyelitis.**—*Ibid.* 408-409. 8 charts.
- IV. BEARD, J. W., FINKELSTEIN, H., SEALY, W. C., & WYCKOFF, R. W. G. (1988). **Immunization against Equine Encephalomyelitis with Chick Embryo Vaccines.**—*Science.* 87. 490. [7 refs.]

I. The method usually employed for the detection of humoral antibody in E.E. has been the intracerebral injection of serum-virus mixtures into mice. The present experiments show that the intraperitoneal route is more sensitive. It should be of value for its ability to detect antibody to a much higher degree and, owing to its sensitivity as a test, to indicate a negative result with a greater assurance that antibody is not present. Mixtures of immune serum and virus given intraperitoneally were found to give protection in dilutions which cause infection after intracerebral injection. The difference in protective power by the two routes is stated not to be due to the amount of inoculum or to the age of mice injected intracerebrally.

II. In treatment of infected equines, doses of 1,000 c.c. or more of anti-E.E. serum are recommended. As a prophylactic, periodic dosing with serum alone is not considered practicable. The use of formalinized horse brain tissue vaccine and of unmodified live virus have not proved satisfactory. A small dose of virus given simultaneously with 50-75 c.c. of anti-E.E. serum is said to have been used on 7,000 horses and mules with "very gratifying results"; the immunity lasts about six months.

III. The prevention of this disease with a vaccine prepared by growing the virus on chick embryos has proved remarkably successful. Virus grown in this way and formalinized protected g. pigs and horses against 1,000 M.L.D. of virus given intracerebrally. Horses given 10 c.c. and 5 c.c. of the vaccine at intervals of ten days were resistant when tested a month later, whereas the controls and horses vaccinated with horse brain vaccine all became paralysed, and had to be destroyed. Chick vaccine produces a resistance so rapidly that it may be used during an epizootic with advantage. Over 250,000 horses in Canada and U.S.A. had been vaccinated up to September, 1988.

IV. The high virus content of chick embryo tissues infected with E.E. virus has been emphasized by the fact that it has proved possible to isolate from these tissues alone a homogeneous substance which seems to be the infective agent. The virus concentration in chick embryo tissues is 1,000-10,000 times greater than in the most infective horse brain examined, and the formalinized extracts of such tissues have proved correspondingly of higher immunizing value. The vaccine used has consisted of a 10% diseased tissue suspension containing 0.4% formalin. A 1% chick vaccine protected about 60% of the vaccinated animals; more dilute vaccines proved worthless. Chick vaccine gave complete protection against 1,000 M.L.D. of virus.—J. A. GRIFFITHS.

- SAHAI, L. (1988). **An Outbreak of Equine Encephalomyelitis in a Mounted Military Police Troop in Bihar. A Preliminary Report.**—*Indian J. vet. Sci.* 8. 841-851. [3 refs.]

Reference is made to "kumri" which is endemic in Bihar and to equine encephalomyelitis as it occurs in America and Europe, and to the more recently reported occurrence of the latter disease in India. The outbreak now described occurred among 29 Australian horses in a small Indian station. 11 animals developed the disease, 10 within a period of five months and the last three months

later; 2 died and 7 were destroyed. Most of the cases were insidious in onset and chronic in their course. There was no fever, symptoms being mainly those of incoordination of action and paralysis of the hindquarters. They were clinically of the type of case that has been diagnosed as "kumri" in the past. Treatment was found of little or no use. Pathological changes consisted chiefly of congestion of the meningeal vessels and some gliosis.

Attempts to infect experimental animals with brain emulsions and cerebro-spinal fluid were not successful. Estimations of the mineral content of fodder and blood-serum revealed nothing abnormal, and no poisonous substance was found in an analysis of the grasses of the district.—F. J. ANDREWS.

HOLZ. (1938). Thrombangiitis obliterans und Ependymitis granularis bei der ansteckenden Blutarmut des Pferdes. [**Thrombo-Angiitis Obliterans and Ependymitis Granularis in Equine Infectious Anaemia**].—*Berl. tierärztl. Wschr.* May 6th. 257-260. 4 figs.

Ependymitis granularis [V. B. 7. 624.] was found in 61% of horses dead of infectious anaemia in Württemberg. Further histological examinations revealed the regular occurrence of thrombo-angiitis obliterans in the arteries of affected horses. The changes consist of nodular enlargements of the intima, leading to the complete occlusion of the smallest vessels. These histological findings explain certain of the clinical signs, observed in the course of E.I.A., such as disturbances of the circulation, oedema, and cardiac insufficiency. Two basic forms of thrombo-angiitis can be distinguished, the first taking the form of polypoid proliferation of the endothelial cells of the arterioles and the second resembling nodular atherosclerosis and occurring in the largest arteries.—V. CHLÁDEK (PRAGUE).

JACOTOT, H. (1938). La peste porcine chez le porc annamite. [**Swine Fever in Annamese Pigs**].—*Rec. Méd. vét. exot.* 11. 153-158. 3 charts.

J. describes acute swine fever of young Annamese pigs up to 4 months old in Indo-China. After inoculation (sub-cut.) of 1 c.c. of a 1:500 dilution of defibrinated virulent blood the incubation period rarely exceeded 3 days. A temperature reaction quickly followed, being high until the 8th or 9th day, and then falling rapidly a few hours to one day before death. Individual resistance varied, death occurring from 4 days (rarely) to 20 days after inoculation. All signs and symptoms of the disease are accentuated. Infarcts of the kidneys and haemorrhagic "pseudo-vegetations" on the mucous membrane of the bladder generally occurred. A generalized skin eruption, best seen on the lower unpigmented parts of the body, was usual and there were exanthematous patches with dark necrotic centres. In more chronic cases a muco-purulent condition of the conjunctiva and even of the anterior chamber of the eye occurred. Contact infection produced very similar disease.

Experiments were made with a virus from Algeria and two local strains. Pigs were equally susceptible to the three strains of virus and avirulent organ emulsions of the Algerian strain gave protection against all three of them.—C. V. WATKINS.

ZOFIJEVSKY, V. (1938). Ueber den Einfluss der Superinfektion mit Schweinepest-virus auf den Verlauf der Reaktion bei der Simultanimpfung gegen die Schweinepest. [**Effect of very Large Doses of Swine Fever Virus on Simultaneous Inoculation against Swine Fever**].—*Z. InfektKr. Haustiere.* 53. 78-87. 4 tables. [5 refs.]

The usual dose of virus recommended is 2 c.c. Z. investigated the results of

a simultaneous serum-virus inoculation when greater doses of virus are administered. Each of 10 pigs received 60 c.c. of serum, and virus in doses from 2-20 c.c. The pigs given 16 and 20 c.c. of virus required additional doses of serum. 18 pigs were given serum in doses of 40-60 c.c. and virus in doses varying from 0.5-50 c.c.; all recovered without treatment. Two control pigs were given 1 and 30 c.c. doses of virus respectively, but no serum. The first animal developed the disease but recovered, the second died of S.F. Z. concludes that the administration of fairly large doses of virus has no peculiar influence upon the simultaneous inoculation, provided that no very large amounts of virus are administered. Provided that the dosage with serum is sufficiently high, there is no danger if an odd animal gets a large dose of virus.—V. CHLÁDEK (PRAGUE).

- I. RÖTHEL, R. (1937). Uebertragungsversuche bei experimenteller Virusstaupe. [**Transmission Tests with Dog Distemper**].—*Inaug. Diss., Hanover*. pp. 44. 2 charts. [Numerous refs.]
- II. DRÄGER, K. (1938). Die Erfolgsmöglichkeiten bei der Behandlung der Hundestaupe auf der Grundlage spezifischer Immunisierung. [**Specific Immunization against Dog Distemper**].—*Vet.-med. Nachr. Bayer-Meister Lucius*. No. 6. pp. 117-128.

I. In inoculation experiments on 83 young dogs by intravenous, intramuscular and unstated routes, it was found that during the initial stages the blood of the affected animals always contained the virus, and that the blood serum was as virulent as the whole blood. Infection was transmitted in some cases by injecting urine of infected animals, or else eye material from affected dogs with keratitis.

In 13% of the test animals inoculation resulted in an attenuated form of the disease, without considerable temperature fluctuations, and after recovery these animals were immune. No difference in pathogenic effect was observed between two different strains of the virus which were used. It is claimed that the virus was transmitted from cat to dog and *vice versa*. No immunological relation could be established between dog distemper and swine fever virus.

II. A general discussion of the value and limitations of antiserum, vaccine and virus for the immunization of dogs against distemper. [Difficulties discussed are such as have been successfully overcome in the Laidlaw-Dunkin method of immunization].

- MITSCHERLICH, E. (1938). Ueber Züchtungsversuche des Virus der Hundestaupe. [**Attempts to Cultivate the Virus of Dog Distemper**].—*Dtsch. tierärztl. Wschr.* 46. 497-502. 6 figs. [Numerous refs.]

The author repeated a test of the filtrability of dog distemper virus. Judging from the ability of virus-containing tissues to fix complement, it would appear that the lymph nodes contain most virus. There is a suggestion that the greatest amount of virus is present in the tissues shortly after each temperature peak. It is claimed that virus was successfully grown in "drop" tissue cultures with spleen and lung mesenchymal cells, and that it was also grown in eggs.—E. J. PULLINGER.

- HUNGERFORD, T. G. (1938). A Note on Fowl Pox Virus Strains.—*Aust. vet. J.* 14. 197-198. [1 ref.]

On three farms H. observed outbreaks of fowl pox among birds which had been vaccinated four or five months previously. As a satisfactory reaction had occurred at that time, H. suggests that subsequent infection may have been due to a strain of fowl pox virus immunologically distinct from that in the vaccine. Material has been submitted to the laboratory so that this possibility may be further investigated.—T. S. GREGORY.

DETTWILER, H. A., & MARKHAM, F. S. (1938). **A Study of the Bacteria Occurring in Commercial Fowl-Pox Vaccine.**—*Poult. Sci.* **17**. 46-48. 2 tables. [5 refs.]

20 samples of fowl pox vaccine were studied bacteriologically. A list of the bacteria isolated is given, and of these only one has been recorded as pathogenic to poultry, *i.e.* *Pseudomonas aeruginosa*. The others were types which are found naturally associated with healthy birds. Three unidentified species proved non-pathogenic in large doses to 8-weeks-old chicks.

The authors conclude that the U.S. federal regulation requiring a test by the intraperitoneal and intratracheal injection of fowl pox vaccine into young healthy cockerels with 10 times the normal dose is sufficient safeguard in the prevention of post-vaccinal diseases, especially when it can be shown that the bacteria isolated from the vaccine are non-pathogenic.—L. E. HUGHES.

CLAUDE, A. (1939). **The Enhancing Effect of Azoproteins on the Lesions Produced by Vaccine Virus, the Shope Fibroma Virus, and the Agent Transmitting Chicken Tumour I.**—*J. exp. Med.* **69**. 641-648. 7 figs. on 2 plates, 3 tables. [10 refs.] [Author's summary copied *verbatim*].

It is known that azoprotein solutions, like testicular extracts, possess the property of causing particles to spread through the dermis. The present work shows that azoproteins exhibit, like testicular extract, the power to increase the size of virus lesions in the skin of rabbits, and the size of tumours in chickens. The results indicate that the extent of the lesion is roughly proportional to the spreading power of the solution. This suggests that the spread of the infective material, over a large area of skin, is directly responsible for the enhancing effect.

The production of extensive lesions by means of spreading agents may have a practical value when large amounts of working material are needed.

- I. PENSO, G. (1933). Intorno a una particolare entità morbosa (riferibile al gruppo delle febbre esantematiche?) da me riscontrata nell'alta Savoia (Francia). [Notes on an Exanthematic Fever (Swineherds' Disease) Found in Upper Savoy, France].—*Boll. Accad. med., Roma*. **60**. 13-23.
- II. URECH, E. (1933). La maladie des jeunes porchers. [Swineherds' Disease].—*Schweiz. med. Wschr.* **63**. 44-45. 2 figs.
- III. DEMOLE, M. (1934). [Swineherds' Disease].—*Rev. méd. Suisse rom.* **54**. 655.
- IV. URECH, E. (1934). [Swineherds' Disease].—*Ibid.* 649.
- V. BOUCHET, H. (1935). Relation sur la typhoméningite des porchers (maladie des fruitiers). [Report on Typho-Meningitis of Swineherds—Swineherds' Disease].—*Boll. Accad. med., Roma*. **61**. 410-412. [In French].
- VI. BOUCHET, L. (1935). Notes cliniques sur la maladie des fruitiers. [Clinical Notes on Swineherds' Disease].—*Ibid.* 413-416. [In French].
- VII. GIORGI-ERAGNE. (1935). Premières recherches de laboratoire sur la maladie des fruitiers. [Preliminary Research on Swineherds' Disease].—*Ibid.* 417-420. [In French].
- VIII. PENSO, G. (1935). Ulteriori notizie sulla particolare entità (Maladie des fruitiers) da me riscontrata nell'alta Savoia (Francia). [Swineherds' Disease as seen in Upper Savoy, France].—*Ibid.* 404-409.
- IX. ANON. (1936). Malattie nuove: la meningite dei porcai. [A New Disease: Porcine Meningitis—Swineherds' Disease].—*Clin. vet., Milano*. **59**. 621-624.

- X. BOCCA, C. R. (1936). Un cas de méningite bénigne des porchers. [**A Case of Benign Meningitis of Swineherds—Swineherds' Disease**].—*Lyon méd.* **158**. 730-733. [4 refs.]
- XI. BOUCHET, L. (1936). Nouveaux cas de méningotyphus des porchers en Haute-Savoie. [**Further Cases of Meningo-Typhus of Swineherds (Swineherds' Disease) in Upper Savoy**].—*Boll. Accad. med., Roma*. **62**. 430-431. [In French].
- XII. CAMPANACCI, D. (1936). La malattia dei porcai (pseudotifo-meningite dei fruttieri): qualche primo rilievo in Provincia di Parma. [**First Cases of Swineherds' Disease in Parma, Italy**].—*G. Clin. med.* **17**. 546-553. 1 graph. [5 refs.]
- XIII. CAMPANACCI, D. (1936). La malattia dei giovani porcai in Provincia di Parma. [**Swineherds' Disease in Parma Province, Italy**].—*Scritti in Onore del Prof. Angelo Ceconi in Occasione del trentesimo anno di insegnamento*. pp. 65-68. 1 graph. [12 refs.] Turin: Minerva Medica.
- XIV. CHARLEUX, (1936). La méningite bénigne des porchers. [**Benign Meningitis of Swineherds—Swineherds' Disease**].—*Pr. méd.* **41**. 346.
- XV. DURAND, P., GIROUD, P., LARRIVÉ, E., & MESTRALLET, A. (1936). Recherches expérimentales sur la maladie des porchers. [**Experimental Research on Swineherds' Disease**].—*Mouvem. sanit.* **13**. 531-537.
- XVI. LESNÉ, E., & BOQUIAN, Y. (1936). Méningites lymphocytaires curables chez l'enfant. [**Curable Infantile Lymphocytic Meningitis**].—*24me Congr. franç. Méd.* **1936**. pp. 121-188. [Numerous refs.] Paris: Masson et Cie.
- XVII. PENSO, G. (1936). Meningotifo eruttivo, sporadico, benigno, a carattere professionale (Maladie des fruttiers). Riassunto. [**An Occupational Disease, Benign Sporadic Eruptive Meningo-Typhus—Swineherds' Disease**].—*Boll. Accad. med., Roma*. **62**. 235-236.
- XVIII. PENSO, G. (1936). Le méningo-typhus éruptif des porchers. [**Eruptive Meningo-Typhus of Swineherds—Swineherds' Disease**].—*Mouvem. sanit.* **13**. 508-530.
- XIX. PENSO, G. (1936). Prima inchiesta epidemiologica in Italia sul meningotifo eruttivo dei porcai. [**First Epidemiological Investigation in Italy on Swineherds' Eruptive Meningo-Typhus—Swineherds' Disease**].—*Boll. Accad. med., Roma*. **62**. 482-487.
- XX. RAYMOND, M. (1936). Sur un cas de Méningite bénigne des porchers. [**A Case of Benign Meningitis of Swineherds—Swineherds' Disease**].—*Progr. méd., Paris*. Sept. 5th. 1936. [Also appeared, almost verbatim, in *Monde méd.* **47**. 782-783 (1937)].
- XXI. ROCH, M. (1936). Les méningites aiguës bénignes de l'adulte. [**Acute benign Meningitis of Adults**].—*24me Congr. franç. Méd.* **1936**. pp. 5-119. [Numerous refs.] Paris: Masson et Cie.
- XXII. WACKER, T. (1936). De la maladie des jeunes porchers. [**Swineherds' Disease**].—*Thesis, Geneva*. pp. 81. 2 figs., 2 tables. [14 refs.]
- XXIII. CHARLEUX, G. (1937). La méningite bénigne des porchers. [**Swineherds' Disease**].—*Pr. méd.* **45**. 452-454.
- XXIV. DURAND, P., GIROUD, P., LARRIVÉ, E., & MESTRALLET, (1937). Études sur la maladie des porchers (maladie de Bouchet). Premier et deuxième mémoires. [**Swineherds' Disease. I & II**].—*Arch. Inst. Pasteur Tunis*. **26**. 213-227 and 228-249. 7 figs., 1 table. [Numerous refs.]

- XXV. DURAND, P., GIROUD, P., LARRIVÉ, E., MESTRALLET, A., & BOUCHET, L. (1938). Études sur la maladie des porchers (maladie de Bouchet). Troisième mémoire. [Swineherds' Disease. III].—*Arch. Inst. Pasteur Tunis*. **27**. 7-17.
- XXVI. FATZER, Hedwig. (1937). Zur Frage der Meningitis serosa und der Maladie des jeunes porchers. [Meningitis Serosa and Swineherds' Disease].—*Schweiz. med. Wschr.* **67**. 709-713. 2 charts. [15 refs.]
- XXVII. LESTOQUARD. (1937). Une nouvelle maladie professionnelle: la maladie des porchers. [A New Occupational Disease: Swineherds' Disease].—*Rev. Méd. vét., Toulouse*. **80**. 432-435.
- XXVIII. LÖFFLER, W. (1937). Beitrag zur "maladie des jeunes porchers" mit meningismus. [Swineherds' Disease].—*Schweiz. med. Wschr.* **67**. 194-195.
- XXIX. STÄHELIN, R. (1937). Die Krankheit der jungen Schweinehirten. [The Disease of Young Swineherds].—*Ned. Tijdschr. Geneesk.* **81**. 315-320. [6 refs.] [In German].
- XXX. BOUCHET, H. (1939). Relation sur la Pseudo-Typho-Méningite des porchers. Maladie de Bouchet. [Report on Pseudo-Typho-Meningitis—Swineherds' Disease]. pp. 7. Annecy: Imprimerie Herisson Frères. [3rd Edit.]

[For earlier abstracts on this subject, see *V. B.* **7**. 219 and 528].

I. This appears to be the first scientific communication on the subject in Italy. P. described Upper Savoy, its climate and topography, the economy of the farms and the methods of collecting milk at the cheese factories; there is also a short description of swineherds' disease (S.D.) in man. He discussed the possibility of transmission by rodents or ectoparasites. There is no description of the associated pig infection. [P. gave much fuller details in a later publication—*V. B.* **7**. 219., abstract VI of that group. The abstract of this article should be read before reading those of the series now published, as the latter are written on the assumption that the reader knows the syndrome as described by PENSO and the association of human patients with pigs fed on by-products of certain cheese factories].

II. S.D. is apparently not rare, U. having observed 15 cases in the two years preceding the publication of this article. He supported MÜLLER's observations [*V. B.* **7**. 219]. His own clinical experiences are here reported. The syndrome in man resembles that of dengue fever. Immunity after recovery is durable; the disease is not contagious from man to man. All patients were young male swineherds working in piggeries associated with cheese factories. None came from farms; all except one were newcomers to the work.

U. considers that the disease is transmitted by the pigs, or by the milk or its by-products (cheese, butter, etc.) Attempts to demonstrate a causal micro-organism had yielded negative results.

III. There is a note in the records of the meeting that D. described a case of S.D. in a young man employed in a piggery. D. discussed the disease, and stated that the only wide-spread pig disease of the country was "pneumo-enteritis".

IV. A note to the effect that U. discussed S.D. at the meeting. In the discussion MENTHONNEX reported having seen similar cases in young Swiss dairy workers in 1981 and 1982.

V. B. referred to a case of S.D. seen in 1914, and gave details. He emphasized that the syndrome was different from that of tuberculous meningitis and of cerebrospinal meningitis. In 1919, when B. returned to his practice after the war, he saw another case. Since then he had seen at least 80 cases, which he discussed.

He had noticed that in the dairies concerned the cheeses were often bad, and were refused by the customers. Consequently at one time he had suspected the illness to be due to the ingestion of spoiled cheese. In 1928, after failing to find any obvious cause, B. observed a case which occurred simultaneously with illness in young pigs at the associated piggery. The affected animals showed symptoms of meningitis, and the carriage of their heads was abnormal. The illness was severe and the owner found that animals apparently dying were saved when blood was drawn from the tail. [Very little information was given concerning the pig disease]. B. described the syndrome in man, emphasizing that it runs in three phases. The first phase is characterized by intestinal phenomena, rigors, fever, and an eruption on the inside of the thighs, followed by a fall in the temperature. In the second phase the patient believes that he has recovered. In 2-3 days meningeal symptoms appear, announcing the third phase, and there is violent headache.

VI. B. had seen about 80 cases in ten years in his neighbourhood, and emphasized that it is strictly an industrial disease of swineherds working in piggeries attached to cheese factories [V. B. 7. 220]. He described three cases in some detail.

VII. The author had been called in to do bacteriological work on cases of S.D. since 1933. Typhoid agglutination tests were negative. In one case on which he carried out blood cultures, agglutination tests for typhoid, *Brucella melitensis* and *Proteus* X 19, examination of stained slides [? blood] and inoculation of g. pigs all gave negative results.

VIII. P. discussed the syndrome in the human cases and mentioned a case in a swineherd whose pigs were healthy. He gave details of discussion between himself and Drs H. and L. Bouchet [See V & VI above] concerning the disease and the circumstances in which it occurs. He also gave details of a discussion with Dr Marquet, a practising veterinarian at Annecy. Dr Marquet had observed illness in young pigs in which there were symptoms of disease of the central nervous system associated with intestinal disturbances. These were commonly attributed to intestinal parasites, or to alimentary intoxication. The other diseases of interest in this connexion in the piggeries of the *fruitières* were paratyphoid enteritis, swine fever, and *maladies rouges*. P. proposed issuing a questionnaire, of which he gave details, to the cheese factories of the Geneva Canton and the Gruyère region, to collect information.

IX. An annotation concerning S.D. No information is given about the associated disease in pigs.

X. B. described illness in a swineherd that occurred in August, 1936, merely making a tentative suggestion that this case might have been S.D. He commented on the syndrome and circumstances of the patient. This illness occurred away from Savoy and Switzerland, and the piggery concerned was not connected with a *fruitière*. The piggery was well kept. B. suggested that the hypothetical associated pig disease is one hitherto unknown.

XI. B. described two human cases and referred to the leucocyte formula of the cerebrospinal fluid in this disease.

XII. C. described the circumstances in which the disease occurs in man and discussed the syndrome. All the cases seen had been in contact with pigs. In one instance C. was able to observe two pigs of the same litter which were looked after by the patient. One of the pigs was much smaller and thinner than the other and had a staring coat. It appeared to be ill, and died five days later. A cursory examination of material from the pig revealed pleural adhesions and some hepatic congestion. No other information was given as to the associated disease in the pigs concerned.

XIII. C. gave a general account of the human disease and described its occurrence in two young girls in charge of pigs. He referred to the work of ARMSTRONG and LILLIE [(1934). *Publ. Hlth Rep., Wash.* **49**. 1019.] on human lymphocytic choriomeningitis. No information was given concerning infection in animals.

XIV. A brief note which does not include any new information.

XV. The authors took blood from a human case on the fourth day of illness, defibrinated it and five hours later inoculated 25 c.c. intramuscularly into a healthy human being. After 12 days there was a rise in temperature and new passages were then made in human beings. The period of incubation in these experiments was 6-13 days (average 6 days), and the period of illness lasted 3-21 days (most often 7-12 days). The symptomatology was discussed. The authors emphasized that the disease caused by the inoculations closely resembled S.D., although there were differences. Further proof of specificity was produced by neutralization of their virus by the serum of a swineherd recovered from the disease. They suggest that a virus which produces such marked fever and always ends in recovery could be used for "pyréthérapie" for certain mental disorders: the experiments they described were carried out on mental patients for this purpose.

*Animal Inoculation Experiments.*—Three pigs weighing 10-15 kg. were obtained from a known "clean" herd and inoculated intraperitoneally with 20-30 c.c. of blood from a human case. After 5-8 days all three pigs developed fever. Two were killed and their blood was virulent in tests on human beings, rats and mice. Brain material from one pig set up infection in a man. Two pigs were inoculated intraperitoneally, one with brain material from one of the above pigs and the other with blood. Both reacted; the temperature remained below 39°C. for five days, ran at 40°-41°C. for five days, then dropped to 39°-40°C. for eight days, and finally again dropped below 39°C. While reacting, the animals lost their appetite and had diarrhoea and a cough. There were no other symptoms and there was no clinical sign of encephalitis.

The authors emphasized that the pig disease was not distinctive, and that for this reason its association with a human infection would be likely to pass without much comment.

*Macacus rhesus* monkeys were found to be less susceptible than man. One was inoculated with 20 c.c. of infective human blood, and after six days developed a temperature of 40°C.; one inoculated simultaneously intraperitoneally and into the brain showed a trace of fever on the tenth day; a third monkey inoculated from the first one remained well.

Two cats inoculated (intraperit.) with 10 c.c. of infective human blood developed a temperature of 40°C. or over after 6-8 days. One was killed on the second day of fever and its blood was infective on injection (intraperit.) into two other cats. Brain material from this cat was inoculated into another cat, with indefinite results.

One ferret inoculated (intraperit.) with virulent human blood developed a temperature of 40°C. on the seventh day and its temperature reached 41°C. on the 11th day. It was killed and spleen material from it was inoculated (intraperit.) into a second ferret, which became infected. The blood of the first ferret was also infective to a rat.

The rat was stated to be the best experimental animal. There is a first rise in temperature said to be due probably to the mass of heterologous albumins injected, but after an incubation period of 6-9 days the temperature ranges from 38°-39°C. or to 39.5°C. for 3-5 days; there may be relapses after the return to normal and the temperature may be higher at the end of the second week of illness than at the

beginning. No rickettsia could be demonstrated in the appropriate tissues after inoculation (intraperit.) of the male rat. After intracerebral inoculation the period of incubation is 4-6 days. Blood, brain and spleen are infective.

The spermophile was a little less susceptible than the rat.

Infection was produced intraperitoneally in mice with blood of an infected pig with a period of incubation of 4-8 days. When inoculated intraperitoneally or under the conjunctiva there was elevation of temperature in rabbits after 7-9 days, but nothing else. It is to be doubted whether the rabbit is susceptible. No indication could be found that the g. pig is susceptible.

*Virulence of Body Fluids.*—In human beings, blood was virulent from the second to the sixth days; cell-free plasma was virulent; plasma passed through an L2 candle was infective. Virus was not constantly present in cerebrospinal fluid. The urine of human cases was infective after a few days of illness; the urine of pigs was constantly infective. Faeces were virulent in the experiments performed. In rats (small scale experiments) the introduction of suspension of infective spleen into the conjunctiva, nose and mouth caused infection. A rat and a cat were fed on infective rat-organs and contracted the disease.

The authors tried to produce infection with pig lice taken from a recently infected piggery, but all the results were negative.

XVI. There is single reference to S.D. in the course of an extensive review on curable infantile lymphocytic meningitis.

XVII. The article is mainly a short description of the human infection. P. suggested that the disease is probably transmitted from the pig to man by an intermediate host which does not fly and which is an obligatory parasite, for example a louse or a tick.

He considers that the disease is an exanthematic fever and calls it eruptive meningo-typhus.

XVIII. P. speaks of concurrent disease in the pigs when cases of S.D. occur. He nearly always found that when there were human cases, there was a history of illness among the pigs tended by the patient. Among examples of cases was that of a girl who took over the work of a swineherd in a *fruitière* and contracted S.D. Another girl took over the duties and she also contracted the disease. Only piglets 1-2 months old are affected. After slight intestinal disturbance, which is variable, there are epileptiform fits with excitement, salivation, sometimes epistaxis, trismus, rigidity and tension of the neck, and pleurosthotonos.

The attacks occur especially at feeding time. The affected animals approach the trough, stop as though frightened, twist their heads and roll over (the Savoyards speak of the pigs having *le tourniquet*). Sometimes the animals jump and fall on their backs kicking their feet. The attack lasts 5-6 minutes. The disease lasts for about a fortnight and the animals become emaciated; the mortality is low. The syndrome is well known locally and has local dialect names ("balordon" in the Parma Province and "mal mazùch" in the Reggio Emilia Province, Italy).

The disease was studied on one occasion during an epidemic at Villa San Manrizio, in the Commune of Reggio Emilia—by Dr Poli, chief veterinary officer of the town. There were 70 two-month-old piglets in the piggery and most of them were affected; one died and 18 were killed for examination; the remainder recovered completely. At autopsy no lesions were present in the abdomen except an anaemic appearance of the liver and kidneys. There was no abnormality in the thorax. Lesions were present in the central nervous system. There was slight reddening of the meninges of the spinal cord and an excessive amount of cerebrospinal fluid which was of a reddish-yellow colour. Macroscopic examination revealed nothing abnormal on section of the spinal cord. The meninges of the

brain were reddened and the blood vessels of the brain cortex were injected. On section of the brain, capillary haemorrhage was observed in several subjects; there was change in the consistence of the grey matter and in some subjects hardening of the ganglion zones. No bacteriological examinations and no histological examinations were made.

P. felt sure that this pig disease was related to the human condition. Locally it was attributed to intestinal worms but he suggested that the worms could not be responsible, and thought that the disease in the pigs was infectious. He said that it could not be any of the well-known pig diseases and that it was not porcine influenza. Local veterinarians who had considered the pig condition had suggested that it might be swine fever. P. said however that it was very different from S.F. The disease in question does not occur as an epizootic, but mostly as sporadic cases. The mortality in the pigs is only about 2%.

P. suggested that the processing of the milk for cheese making might have something to do with the development of the disease in the pigs. In Emilia pigs are fattened, and there is no breeding; the animals are purchased at 4-8 weeks old, being obtained from places in Tuscany. In these areas in Tuscany, where no skim milk is fed, there are no cheese factories and the disease does not occur. Incidentally, S.F. had been wide-spread in Tuscany, a further argument that S.D. is unrelated to it.

P. suggested that the use of skim milk as a basal ration might influence the incidence of the disease by exalting a saprophytic virus that exists in the pigs. He emphasized that the human disease is not contagious from man to man and that cases occur sporadically without any direct relation to each other. This is the case in spite of the fact that when one case occurs in a *fruitière*, no precautions are taken and there is much opportunity for close contact with the infected surroundings.

Similarly, P. argued, the disease is not directly transmissible from the pig to man. People merely living near the piggeries do not contract the disease. Pig dung is used as manure, yet those using the manure do not become affected, though they often handle it when it is fresh. Moreover, the disease does not occur in the families of the swineherds. It was suggested that this indicates the operation of an intermediate host, and probably not a winged one: the pig louse was suspected.

P. compared S.D. with lymphocytic meningitis referring to the review by Roch [see XXI, below].

XIX. The matter in this paper is included in XVIII, above.

XX. R. saw what he considered to be a case of S.D. at Oued Zem, Morocco. The patient had had nothing to do with pigs, but ate a great deal of pork and *fromages fermentés*. No other details are given relating the case to pig infection and the diagnosis rested purely on the clinical picture.

XXI. A very detailed general review of acute benign meningitis of adult human beings. One page of this extensive article is devoted to S.D. and the information given concerning it is of a general nature.

XXII. W. who was a pupil of ROCH [see XXI] gives credit to L. BOUCHET for the recognition of the disease. He says, however, that MÜLLER (1932) and URECH (1938) gave the first clinical description of the disease and that PENSO [see I] did not know of the papers of MÜLLER and URECH when he gave his account of the disease in 1938. W. is of the opinion it is not possible to say whether S.D. is a new disease transmissible to man, and suggests that it may possibly be due to a saprophyte of pigs recently become a pathogen. He describes three cases.

W. investigated the geographical distribution of the disease and gives some details concerning its incidence in France and Switzerland in five dairy institutions. The incidence reported was :—(1) four cases a year out of 20 pupils ; (2) three cases in one month ; (3) two cases ; (4) four cases a year out of 12 pupils, and (5) 15 cases altogether.

He reports that eleven medical men had knowledge of the disease in their respective areas in Switzerland and France, and seven of them gave information on 80, over 20, 12, 7, 5, 5, and 4 cases respectively ; one or two had seen cases the number of which is not stated.

In one practice three brothers at a *fruitière* contracted the disease at six-monthly intervals. In another instance a mechanic who had never been in contact with pigs cleaned pigsties and became infected a fortnight later. A carpenter did some work in a piggery and became affected. An 11-year-old boy stayed a short time at a *fruitière* and contracted the disease.

W. states that centres of infection are very numerous in Upper Savoy, and that the disease can be traced back for 12 years in Switzerland. It occurs frequently in Vaud and Berne, and is also seen, but more rarely, in Geneva. It does not occur in dairies or cheese factories where pigs are not kept.

W. had great difficulty in obtaining information, as pig keepers do not like enquiries concerning the pig disease. Dr H. BOUCHET has seen an obscure pig disease associated with swineherds' disease and spoken of *meningotyphus des jeunes porcs* in which there are digestive disturbance and meningitic affection. Dr MARQUET, a veterinary practitioner at Annecy, also knows of a disease of young pigs with these symptoms.

XXIII. C. speaks of 11 cases he has seen since 1927 and describes the syndrome. Eight of the cases were associated with *fruitières*. Cases occur most commonly on the French-Swiss frontier, in the cantons of Vaud and Berne, and rarely, in the Cantons of Geneva or Fribourg. They are seen sporadically in the Department of Savoy, in the Upper Loire and in Italy in the Parma region. They occur at all seasons, but are more frequent in summer.

The patients' employment seems to be the most important predisposing cause. Transmission probably occurs from pig faeces, and an intermediate host, possibly the rat, may play a part.

In rare cases pigs presumed to be responsible for the infection actually have "meningo-typhus", but it is probable that pigs may be affected and infective without showing marked illness. As a rule, when human cases have occurred, there have been no epizootics of well-known pig disease.

XXIV. Much of the matter in this article has been published already though in less detail [see XV, above].

The authors discuss chorio-meningitis [see review by ROCH, XXI p. 777]. They emphasize that H. BOUCHET [see V above, XXIX p. 781] was the first to recognize the disease, and they give a good review of the literature.

They describe an extensive series of inoculations with infective blood from a human case administered to 78 lunatics intramuscularly to induce a curative pyrexia, the inoculations involving considerable passage of the virus through human beings and animals. Details of the reactions in these persons are given. Pyrexia occurred regularly for a few days after an incubation period of about eight days. Some of the individuals were given virulent material at a later date to ascertain if immunity had developed, and this was usually the case. The bi-phasic curves described by PENSO [V. B. 7. 219, abstract VI] did not occur.

In these experiments on human beings the virus was nearly always present in the blood on the seventh day after inoculation. It was present in cell-free

plasma and passed an L2 filter. The cerebrospinal fluid of these artificial cases contained virus on some occasions, but not on others. When tested urine was infective.

The authors discuss the usual method of infection. Lice are common on the pigs in the affected districts, but human cases have occurred when the associated pigs were definitely free from lice. Abattoir workers are frequently bitten by pig lice in the course of their work, but they do not contract S.D.

Attempts were made to transmit the disease to human beings by permitting lice to feed after an infective meal, and by inoculating material obtained by grinding up such lice, but always with negative results. When tested later by the inoculation of virulent blood these experimental subjects were not immune.

In experiments carried out, faeces of affected human beings and pigs were infective. The authors describe an instance where a lunatic became infected after handling bedding soiled with faeces from an experimental human case and another where the infection was considered to have been acquired through handling pig faeces.

XXV. The authors discuss theories which have been advanced concerning the manner in which human beings are infected.

Lice (*Haematopinus suis*) are common on the pigs of the affected areas. Severe illness in pigs can develop from louse infestation and this louse will bite man. The authors give examples of *fruitières* in which cases of S.D. had occurred and louse infestation was severe, moderate and absent (only one example of each).

They had difficulty in accepting owners' statements that there were no lice on their pigs, as this may have been said to avoid trouble with the authorities on hygienic grounds. The authors, however, quote Bocca [see X p. 774.] and emphasize that he was well acquainted with the subject and was able to state that the pigs associated with the case he described were free from lice. [B. only saw one human case and merely suggested that it probably was swineherds' disease. The patient came from a piggery that was not related to cheese making].

*Experimental Work.*—Attempts were made to infect human beings by bites of *Haematopinus suis*, or by ground-up lice instilled into the conjunctiva, or placed on scarified skin, or inoculated subcutaneously. Lice were collected from infected *fruitières* and from the Paris and Lyon abattoirs, those collected from the abattoirs being fed on artificially-infected pigs. Test persons were lunatics submitted to pyretotherapy.

Eight hungry lice and 8 days later another 20 hungry lice, were allowed to feed on a human being. The patient remained in good health for a month. He was then inoculated (subcut.) with virulent blood and developed the disease.

2-3 drops of ground suspension of about 15 lice (integument previously cleansed) were placed on the conjunctiva of a human being (neither conjunctiva nor cornea scarified); on the same day he also received a similar suspension subcutaneously. Three days later another conjunctival dose from other lice was given. The suspension was also applied to a scarified area on the forearm. There was no reaction for a month. The subject was then given a dose of virulent blood subcutaneously, and developed the disease.

For the next experiments the following procedure was adopted:—a pig was inoculated (intraperit.) with virulent blood, killed in ten days at the height of the reaction and its blood inoculated into a man, and also into another pig: then a box containing clean pig lice was fixed to the skin of the latter pig and 12 days later surviving lice were used for experiments A, B and C.

A. A human being was bitten by four of the lice, four days later by two lice in the morning and eight in the evening, the lice used this day having been collected

from pigs in a *fruitière* on which a case of S.D. had occurred. [No information given as to health of pigs]. Again, one day later (5th day) the patient was bitten by three newly-hatched lice from nits laid in the box, attached to the pig, and by three lice from the above *fruitière*. The subject remained healthy, but he acquired the disease when given a test inoculation a month later.

B. A human being was given (subcut.) a suspension of four ground-up lice that had just bitten the lunatic used for experiment A on the day he was first exposed to the bites. There was no reaction, but the patient reacted to a test inoculation given a month later.

C. A suspension of 12 ground-up lice, from the box on the pig, was inoculated on to both conjunctivas of a human being, after light scarification. There was no reaction, but the patient reacted to a test inoculation given five weeks later.

D. 14 ticks were collected from a Paris abattoir and put on an infected pig the day fever started (the pig having been infected from human infected blood); after 14 days on this pig lice were ground up and inoculated subcutaneously. No reaction occurred; the patient reacted to a test dose given a month later.

Thus the authors were not able to produce evidence incriminating the louse. They considered, however, that these experiments do not dispose of the louse infection theory.

Another theory is that human beings are infected from pig faeces. PENSO had emphasized that those who nursed the patients and washed their linen, often with no precautions, never got the disease. The authors demonstrated that the virus is in the faeces of human and pig cases, and gave two instances that confirm this view.

The first occurred in a well-run piggery that could be taken as a model for management; it was in the Lyon region where no S.D. had been seen. A lunatic was working there. He was in good health and suddenly became ill with S.D. On recovery he was given an infective dose that infected a control lunatic, but he did not react. Later it was found that the lunatic in question had used as bedding for his pigs the contents of mattresses soiled with faeces by paralysed patients used in the authors' infection experiments; this was the only contact with infective material. The pigs never showed any illness; the lunatic must have contracted the disease through handling straw soiled by excrement from the experimental human cases.

The second instance of infection from faeces was of a farmer who contracted S.D. He had had no direct connexion with pigs. It was found that one of the fields which he cultivated lay at a lower level than a piggery 80 metres away and at which there had been a case of the disease in 1936. The lease of the field included the right to manure with sewage from the piggery, which was conveyed to the top of the field by a drain. 15 days before the patient became sick he dug over this field, which at the time was marshy and foul-smelling with the accumulation of sewage from the piggery, which had been washed into the field by recent rain. The work took more than one day and his hands were chapped and came in contact with the pig dejecta; his face was probably also splashed with infective material.

XXVI. F. discusses the syndrome of S.D. and compares it with lymphocytic choriomeningitis as described by ROCH [see XXI p. 777]. She reviews the 18 cases of meningitis serosa which had been treated during the previous ten years at the Basle University Clinic. Of these, two were of interest in relation to S.D.

(1) A swineherd from a large piggery near Basle. A pig died after one day's illness with a temperature of 41°C. The patient opened up the pig to examine it and noticed that there were inflammatory lesions. No veterinary aid

was sought. The patient's illness began the next day, and the day after that a second pig sickened and died. F. got a piglet from the piggery six days after the man sickened. She was unable to get pigs for inoculation, but attempted to infect rabbits, g. pigs and mice from it, all with negative results.

(2) This case occurred a fortnight before the one described above. A young man at the end of a brief period of military service lay down for half an hour in an empty wooden vat by a piggery and became ill three days later. The vat had been used for scalding pig carcasses. There was no further history to incriminate infection from pigs, but F. heard later that there had been swine fever at the piggery earlier in the year.

Very complete details are given of the results of observations on the human patients.

Enquiries made concerning pig disease in the neighbourhood of Basle that might be associated with human illness did not yield any real information. Some suspicious human cases were traced, but the information available was never sufficiently detailed to be of value. Similarly, accounts received concerning pig disease did not yield exact information to support the belief that a hitherto unknown disease had existed. In many cases no veterinary aid had been enlisted and no skilled evidence was available. Swine fever had been prevalent. There were, however, reports from laymen of a pig disease of a meningitis type.

XXVII. In a brief note L. points out that veterinarians may contract S.D. in the course of their duties. The pig disease from which the human patients are presumed to contract infection is not well understood and requires investigation. In the regions affected it is known as *méningo-typhus de porc*, the affected animals showing intestinal and meningeal disturbances, while pleurothotonos is a notable symptom. Human beings appear to contract the disease after repeated and habitual contact with presumably affected pigs and circumstantial evidence suggests the operation of an intermediate host, *Haematopinus suis* being under suspicion. L. suggests that the disease belongs to the exanthematic typhus group.

XXVIII. A brief description of a case.

XXIX. A brief general review of S.D. literature prompted by seeing the two cases described by FATZER [see XXVI, p. 780]. The history and syndrome of the two patients are described in some detail. S. comments on the resemblance of the illness in these two patients to meningococcus infection and to tuberculous meningitis.

A pig was obtained from the piggery in which the first patient worked; it became ill a few days later, and was examined by Professor Dörr and Dr Seidenberg. However, inoculation results were negative and so were the results of P.M. examination. The canton veterinary surgeon, Basel, suggested that the disease was swine fever; S. found that there had been swine fever at farms concerned in the second case, but he doubted if the disease was really swine fever, and suggested that it was some other hitherto unknown infection.

XXX. [This is marked Third Edition. There is another, but undated, publication in different format, but identical as to wording except that the 1939 edition has "Maladie de Bouchet" added as a sub-title. It is likely that current usage concerning the date of printing and the number of the edition was not followed in the earlier editions. The undated publication is referred to by DURAND, GIROUD, LARRIVÉ and MESTRALLET [see XXIV, p. 778.] and by other authors as the earliest one on the subject, but no evidence as to date of publication can be found].

The material in this article is the same as in V.

BURNET, F. M., & FREEMAN, M. (1988). "Q" Fever: Factors Affecting the Appearance of Rickettsiae in Mice.—*Med. J. Aust.* Dec. 81st. 1114-1116. 3 tables. [2 refs.]

The authors demonstrated the importance of the time which should be allowed to elapse following inoculation of mice with material suspected of containing the rickettsia of "Q" fever, before spleen smears are examined or agglutination tests performed. After the optimal period, rickettsia in the spleen and liver rapidly diminish in number and fail to induce demonstrable infection on subinoculation. Agglutinins appear in mouse blood about seven days after inoculation. Irradiation of mice with just sub-lethal doses increases the intensity of infection with "Q" fever rickettsia.—T. S. GREGORY.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

GILL, D. A., & GRAHAM, N. P. H. (1989). Studies on Fly Strike in Merino Sheep. No. 1.—The Effect of Mules' Operation on the Incidence of "Crutch" Strike in Ewes. No. 2.—Miscellaneous Observations at "Dungalea" on the Influence of Conformation of the Tail and Vulva in Relation to "Crutch" Strike.—*J. Coun. sci. industr. Res. Aust.* 12. 58-70 and 71-82. 17 tables, 2 graphs. [18 refs.]

I. Previous observations on Mules' operation for the removal of skin folds (wrinkles) from the "crutch" region of sheep are reviewed. An extensive field trial is described and results are summarized in tables. The technique of the operation is fully described. The operation, properly performed, was highly successful as a means of reducing the incidence of "crutch" strike. In an experiment involving 650 sheep, over a period of 14 months, there were 13-22 "crutch" strikes among the control (untreated) sheep for every one such strike among those on which the operation had been performed. The necessity for re-treatment of a small percentage of sheep that were not adequately dealt with on the first occasion was clearly shown.

The operation is quickly and easily performed, causes only transitory pain, and the wounds heal with remarkable rapidity. While the wounds themselves do not appear to be attractive to blowflies, it is considered that the operation should not be performed during a period when blowflies are actively striking the sheep, nor in the summer months when the wounds are liable to serious irritation from bush flies (*Musca spp.*).

II. The observations recorded deal with factors, other than the presence of "crutch" skin folds (wrinkles), which have been stated to increase susceptibility to fly strike in the breech area. Minor degrees of deflection of the vulva, commonly encountered among ewes, had no relation to strike incidence. While further careful observations are required to determine the best principles to follow when docking the tails of lambs, observations recorded in this paper suggest that less trouble from fly strike is to be anticipated from docking the tail long than from cutting it too short. A very close association was noted between the extent of crutch skin fold development and tail skin fold development.

In the light of these observations the authors see no reason why Mules' operation of fold removal should not be utilized for the reduction of crutch strike in merino flocks concurrently with a breeding policy designed to eliminate the more wrinkly-breeched sheep.—H. McL. GORDON.

EICHLER, W. (1987). Untersuchungen zur Epidemiologie der Aussenparasiten.

I. Federlöcher und ihre Deutung. [**The Epidemiology of Ectoparasites.**

**1. Holes in Feathers caused by Parasites].—Arch. wiss. prakt. Tierheilk.**

**72.** 280-284. 6 figs. [Numerous refs.]

E. states that by puncturing the quill of growing tail feathers in pigeons he succeeded in reproducing defects in the barbs similar to those which were described by HENRY and LEBLOIS [*Rec. Méd. vét. exot.* **99.** 896.] in 1928, and which were attributed by them to the agency of the pigeon mite (*Falculifer rostratus*). From these experiments he infers that such defects in the feather barbs are the result of mechanical injury to the quill of the developing feathers, or possibly also to constitutional disturbance.

STENDER, Margarete. (1988). Milbenerkrankungen unserer Haus- und Nutztiere.

[**The Injuries Caused to Domestic Animals in Germany by Mites and Ticks**

**(a General Survey)].—Z. hyg. Zool.** **30.** 255-264 and 281-290. 11 figs.

[16 refs.]

A summary, in popular language, of the principal forms of mite and tick infestation in horses, cattle, sheep, pigs, silver foxes, rabbits and poultry. Types of the genera *Sarcoptes*, *Chorioptes*, *Psoroptes* and *Dermanyssus* are described, with the symptoms and results of infestation and the common methods of control. Brief notes on poultry infestation by *Argas reflexus* and on infestation of domestic animals by *Ixodes ricinus* are also given.—J. MACLEOD.

OSWALD, B. (1989). Ponte du *Rhipicephalus bursa* dans des conditions favorables.

[**Oviposition by *R. bursa* under Favourable Conditions].—Ann. Parasit.**

**hum. comp.** **17.** 170-173. 1 fig., 1 table.

Under suitable conditions of moisture and temperature, oviposition by fully and partially gorged female *R. bursa* ticks was found to follow a constant type of curve, the daily egg output reaching its maximum in 2-6 days, after which it dropped gradually during the next 10 days or so to a very low level, at which it remained until the 21st-23rd day, when oviposition ceased. Changes in the daily output or shape of the output curve were not affected by fluctuations in barometric pressure.—J. MACLEOD.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

HENRY, A. (1937). Prophylaxie des helminthoses. [**Prevention of Helminthiasis**].

—*Rec. Méd. vét.* **113.** 728-749. 4 figs.

Reference is made to the existing methods of controlling parasitic diseases. The different evolutionary phases of the most important parasites are described, together with a summary of the general prophylactic measures that may be employed in controlling parasitic diseases.—A. L. WILSON.

CAMPBELL, D. H. (1987). **The Immunological Specificity of a Polysaccharide**

**Fraction from Some Common Parasitic Helminths].—J. Parasit.** **23.** 348-

**353.** 1 table.

A method for the isolation and purification of a polysaccharide fraction of helminths is described. The fractions from the different worms are similar in their qualitative chemical properties. Rabbit antisera were prepared against certain of the helminths to test the polysaccharides by means of the precipitin ring test. The polysaccharide fractions exhibit far greater specificity than do saline

extracts of whole worms; the latter react to heterologous sera, whilst the former react only to homologous antisera. Thus, C. showed that *Ascaris lumbricoides* and *A. suum* differ antigenically as well as biologically. No cross reactions occurred between the ascarids and tapeworms.—M. L. BINGHAM.

- I. WERTHEIM, P. (1988). Istraživanje metiljavosti. *Galba truncatula* u okolici gračaca, mogućnost njezina suzbijanja i njezino značenje za metiljavost. [*Galba truncatula* in the District of Gracac (Western Yugoslavia). Its Possible Control and Its Significance in Relation to Liver Fluke Disease].—*Jugoslav. vet. Glasn.* 18. 95-105. 5 figs., 5 tables, 1 map. [6 refs.]
- II. MARTINCIC, M. (1988). Neobični tok i neobični patološko anatomske nalaz metiljavosti godine 1986 i 1987. [*Unusual Course and Unusual Findings of Liver Fluke in 1986 and 1987*].—*Ibid.* 149-153. 2 figs.
- III. MIRKOVIC, M., & BUTOZAN, V. (1988). Metiljavost ovaca 1987 god. u Podražkom Polju središta Mrkonjic - Grada Vrbaske banovine. [*Liver Fluke Disease in Sheep in 1987 in the Valley of Podraska, Mrkonjic-Grad District, Vrbas Province*].—*Ibid.* 186-191. 2 tables, 1 map.
- IV. WERTHEIM, P., & RUKAVINA, J. (1988). Istraživanje metiljavosti VII. Nalazišta, životni uslovi metiljskog puža i metiljavosti u srezu Gospić. [*Factors Governing the Life of the Liver Fluke Snail and Its Distribution. Liver Fluke Disease in the District of Gospić*].—*Ibid.* 355-373. 4 figs., 9 tables, 1 map, 1 diagram. [10 refs.]

I. The district of Gracac was examined for *G.t.* throughout 1987. This snail was found chiefly in swamps (so-called *pistalina*), and also, but not so frequently, in other kinds of pastures. The habitats of the snail are static, but they are distributed more or less irregularly over the district. *G.t.* is the only host snail of the liver fluke in the area, and rather a large proportion of infested snails are found. The most intensive development of the snail takes place in spring, and its life does not exceed four years; attempts at control should therefore take place in late spring and early summer.

II. Many cases of acute fatal diseases of cattle occurred in the autumns of 1986 and 1987 in certain parts of Croatia and Bosnia. There were symptoms of acute peritonitis and pleuro-pneumonia and the P.M. findings included fibrinous adhesive perihepatitis and peritonitis, and abundant peritoneal exudate (up to 40 litres). The liver was perforated and severely damaged by the emergence of liver flukes from its surface and the organ contained numerous flukes internally.

III. An unusually severe outbreak of liver fluke disease in sheep occurred in the autumn of 1987 in the district of Mrkonjic-Grad in Bosnia. Unaffected sheep were treated with "protumetilj" capsules (a  $\text{CCl}_4$  preparation made at the State Veterinary Experiment Station, Zagreb) with encouraging results.

IV. *G.t.* is distributed all over the northern coast of Gospić, western Yugoslavia, chiefly on heavy, damp soil. It lives in this district under different circumstances from those in the neighbouring district of Gracac [see I, above], its habitat in Gospić being generally a brook rather than a swamp. It is worth noting that here the snail is sometimes found clinging to stones, which evidently enable it to survive dryness more easily. Here also *G.t.* is the only vector of the liver fluke. Owing to the heavy losses caused by the liver fluke throughout Yugoslavia, the establishment of a committee for liver fluke control is suggested.

—B. OSWALD (KRIŽEVCI).

LÜTJE. (1988). Leberegelerkrankungen beim Reh im Regierungsbezirk Stade. [*Liver Fluke Disease in Deer in the District of Stade*].—*Dtsch. tierärztl. Wschr.* 46. 769-772. [7 refs.]

A general paper dealing with fluke disease in deer. A description of the pathology and clinical symptoms is given.—A. L. WILSON.

HSTØ, H. F., DU, S. D., & CHOW, C. Y. (1938). **On Two Species of Trematodes [*Microtrema* and *Metorchis*] from the Liver of the Cat in China.**—*Bull. Fan. Inst. Biol. Peking. Zool. Ser.* **8.** 1-8. 1 text fig., 14 figs. on 1 plate, 2 tables. [5 refs.] [In English : Chinese summary].

*Microtrema truncatum* is recorded for the first time in the cat ; it was found in the gall-bladder. The authors consider that *Metorchis* found in dogs and cats in China should be regarded as a distinct species, *Metorchis felis*, because of certain morphological features which distinguish it from *Metorchis albidus*, the European species.—A. L. WILSON.

FLORENCE, R. (1939). Existence chez les bovins de Madagascar de l'*Eurytrema pancreaticum*. [*E. pancreaticum* in Cattle in Madagascar].—*Bull. Soc. Path. exot.* **32.** 446-447.

It is stated that the parasite has not previously been recorded from Madagascar. Examination of the pancreas of cattle in the abattoirs revealed that it was very common and most of the affected animals were calves. Animals reared on or near the coast harboured more parasites than those reared on the higher lands.

—A. L. WILSON.

SHAW, J. N., & HOWARTH, C. R. (1939). **Immunity to Salmon Poisoning Follows Treatment of Affected Dogs with Sulfanilamide.**—*N. Amer. Vet.* **20.** No. 5. 67-68. [2 refs.]

Particulars are given of one dog that was fed parasitized salmon, was treated with sulphanilamide and recovered, and on being again fed parasitized salmon was not affected. It is stated that two other dogs were treated in the same manner as the first one, but no details of the treatment of these are given. Control animals were used but no particulars are given as to how they were dealt with.—W. J. I.

LEVINE, P. P. (1938). **The Effect of Infection with *Davainea proglottina* on the Weights of Growing Chickens.**—*J. Parasit.* **24.** 550-551. 1 table.

A group of seven-week-old chickens was experimentally infected with *D. proglottina*. From the 85th day until the end of the experiment on the 186th day after infection, they showed a lower weight increase than the non-parasitized control birds, although the food intake of both groups was practically identical.

—M. L. BINGHAM.

BUCK, G. (1939). Un parasite des poules nouveau pour Madagascar : *Tetrameres fissispina*. [*T. fissispina* : a New Fowl Parasite in Madagascar].—*Bull. Soc. Path. exot.* **32.** 447-448.

The parasite was found singly or in association with another parasite, *Acuaria spiralis*, in the proventriculus of various breeds of poultry. In heavy infestations the wall of the stomach was thickened, the mucous membrane was congested and the birds were emaciated.—A. L. WILSON.

CHRISTIANSEN, M. (1938). Igler (*Protoleipsis tessellata* O. F. Müller) som Aarsag til Sygdom, bl. a. Konjunktivitis, hos Gaes og Aender. [*Leeches (Protoleipsis tessellata) as a Cause of Conjunctivitis in Geese and Ducks*].—*Maanedsskr. Dyrlaeg.* **50.** 409-425. 4 figs. [19 refs.]

A flock of young geese, which had free access to a muddy pond, were observed

in June to July to be affected with severe conjunctivitis with muco-purulent discharge from the eyes. The cause of the trouble was a heavy infestation of the conjunctiva with immature forms of the leech *P. tesselata*: 37 were found in one young goose; from the right and left nasal cavities 29 and 20 leeches respectively were gathered and a further four from the mouth cavity. On another goose a large number of leeches were attached to the featherless skin covering the top of the head as well as to the conjunctiva.

The flock quickly recovered when removed from the pond. On a transitory inspection in September of the pond and the brook from which it was supplied no species of *P. tesselata* was found. According to zoological records *P. tesselata* is not very frequently found in Denmark. The heavy infestation registered in this case is therefore most unusual.

The literature on *P. tesselata* as a parasite is reviewed and a survey is given on the morphological structure and life-history.—GUSTAV NAERLAND (OSLO).

- I. CAMPBELL, D. H. (1988). **The Specific Protective Property of Serum from Rats Infested with *Cysticercus Crassicoilis*.**—*J. Immunol.* **35**. 195-204. 8 tables. [4 refs.]
- II. CAMPBELL, D. H. (1988). **The Specific Absorbability of Protective Antibodies against *Cysticercus Crassicoilis* in Rats and *C. Pisiformis* in Rabbits from Infected and Artificially Immunized Animals.**—*Ibid.* 205-216. 8 tables. [8 refs.]

I. The author maintained cats artificially infested with *Taenia taeniaeformis*. Estimated numbers of mature onchospheres from these were fed to healthy albino rats by stomach tube, about 85% of these numbers of parasites appearing 7-10 days later. The rats were killed 5-6 weeks later, this period allowing viable cysts to be counted on the surface of the liver.

Pooled sera from heavily infested rats (fed 10,000 onchospheres per rat) and from lightly infested rats (fed about 38 cysts per rat) were taken from groups of eight rats at intervals from 7-28 days later. These sera were tested in 15 c.c. amounts injected intravenously into 100 g. male rats which were dosed concurrently with 200 onchospheres. Protection was greater in the case of sera from heavily infested rats.

Minimal protective dosage with various sera was estimated in a further experiment. A "late immunity" and an "early immunity" were thereby demonstrated, the former inhibiting encystment and the latter destroying the larvae.

II. The author studied immune sera, obtained from animals artificially immunized by whole worm material (*C.c.* and *C.p.*), to determine whether new antigens were formed by the host's reaction to the organism itself and, secondly, whether new antigens might arise from the developmental activity of the parasite.

Antibody absorption tests of 11-day and 28-day sera from infected rats were made with worm suspension and worm solid (fresh larval whole worm material ground up, suspended in NaCl solution combined with the serum, and then centrifuged). Both absorption methods removed the antibodies in 11-day sera, but were without effect on the 28-day sera. In the case of rats and rabbits artificially immunized by freshly ground worm material against *C.c.*, specific absorption tests with worm material showed that antibodies were completely removed.

The author therefore considers that unabsorbable antibodies, formed as a result of active infection, are induced by antigenic substances which are probably associated with the actual growth and development of the parasite within the host.

Similar tests of sera of rabbits infested by and immunized against *C.p.* were made, and non-absorbable humoral protective substances in the sera from the infested hosts only were again demonstrated.—C. V. WATKINS.

## IMMUNITY

- I. JENSEN, K. A., BINDSLEV, G., MÖLLER, S., HANSEN, A., & LIND, P. (1938). **Old Tuberculin and Purified Tuberculin. Standardization. Preparation of Stable Solutions. Introduction.**—*Tubercle, Lond.* **19**. 385-397. 9 tables.
- II. JENSEN, K. A., BINDSLEV, G., MÖLLER, S., HANSEN, A., & LIND, P. (1938). **Old Tuberculin and Purified Tuberculin. Standardization. Preparation of Stable Solutions. Part II. Purified Tuberculin.**—*Ibid.* 433-446. 24 tables. [17 refs.]

I. The article records investigations to simplify the Mantoux test and studies on the stability of dilutions of purified tuberculin. The methods of standardization of tuberculin are described. The shock method is not so reliable as the intradermal test, moreover the shock and intradermal effects of tuberculin need not run parallel; both tests can be done on the same subject. In human beings and g. pigs the reacting power varies with the site employed.

Tables show results of comparative intradermal tests on students, using Seibert's P.P.D. and purified tuberculin prepared by the authors. The method of reading reactions and of testing a tuberculin against the standard are described.

As diluting agent phenol reduced potency in 14 days. With a phenol-buffer solution the duration of potency was extended, and with 0.01% quinosol instead of phenol the activity of tuberculin remained unimpaired for one month.

II. Purified tuberculin prepared according to Seibert's method from Sauton medium tuberculin was diluted using buffer solution with 0.01% quinosol. Comparative tests with varying dilutions of purified tuberculin and International Standard Tuberculin were carried out on human beings. Patients were also tested with differing dilutions of purified tuberculin and dilutions of 1:50,000 and 1:500 both gave satisfactory reactions in Mantoux tests.

Difficulties encountered in the production of purified tuberculin are pointed out. Media containing iron gave a greater yield of tuberculin. For the ultra-filtration Seibert's 12-13% collodion membrane was replaced by 7% membrane, which resulted in slight loss of tuberculin but hastened dialysis. Simplified apparatus and technique for small scale production of purified tuberculin is described in detail.—J. REID.

FEILDMAN, W. H., & STASNEY, J. (1937). **Leukemoid Response of Tuberculous Rabbits to Administration of Tuberculin.**—*Amer. J. med. Sci.* **193**. 28-38. 2 text figs., 3 figs. on 2 plates, 1 table. [Numerous refs.]

Absolute and differential white blood corpuscle counts were made in 9 rabbits injected subcutaneously with old tuberculin (10 mg. per kg. body weight) four weeks after infection with TB. (7 with the bovine type and one each with the human and avian types). Nine non-tuberculous rabbits served as controls.

It was found that the injection of tuberculin caused in tuberculous rabbits an intense leucocytosis, involving predominantly the granulocytes, though there was also a noteworthy increase of immature myelocytes which gave the blood picture a leucaemoid appearance, such as has been recorded in tuberculous human beings.

There was no leucocytosis in the controls.—J. E.

STASNEY, J., & FELDMAN, W. H. (1988). **The Character of The Leukocytic Response to Tuberculin in Sensitised Calves.**—*Amer. J. med. Sci.* 195. 20-27. 2 figs. [10 refs.]

The writers attempted to produce a "leukemoid" reaction in calves, a condition which they had previously [see preceding abstract] shown can be elicited in rabbits. Of eight calves six were inoculated with a virulent strain of *Mycobact. tuberculosis*, the other two being kept as controls. Blood was examined before and after infection. After eight weeks two doses of tuberculin were given intradermally into the caudal fold at intervals of seven days. Infection produced fluctuation in the leucocytic count of the 6 calves. The first injection of tuberculin provoked leucocytic increase, mainly due to neutrophiles; there was a decrease in the number of lymphocytes. The second injection of tuberculin caused over-stimulation of myeloid tissue and immature white cells were demonstrable. The blood reaction was not of the same degree as that produced in rabbits, and the writers suggest that this is because the bone-marrow of most cattle is incapable of a sudden excessively large production of neutrophiles, whereas the converse is true of rabbits. —J. REID.

MASCH, H. (1988). Beitrag zur intrakutanen Tuberkulinisierung beim Schwein. [**Intradermal Tuberculin Testing in Pigs**].—*Inaug. Diss., Berlin.* pp. 27. 4 tables. [Numerous refs.]

M. applied the single intradermal tuberculin test to the middle of the outer surface of the ear in 184 pigs and compared the results with P.M. findings. A mixture of "bovotuberkulin" and avian tuberculin was used. Of 15 pigs showing evidence of TB. after slaughter, reactions of over 4 mm. were recorded in 12, and reactions of 2.5 mm. or less in the other 3. There were no false positive reactions. Similar tests on 31 other pigs demonstrated the reliability of the test in the 4 tuberculous animals. [No detail is given concerning the origin of the tuberculin used].—J. E.

PLUM, N., & RUSSEFF, C. (1989). **Immunobiological Studies on Brucella abortus Bang for Establishment of a Serviceable Allergic Diagnostic Means.**—*Skand. Vet. Tidskr.* 29. 51-53. 5 figs., 2 tables. [20 refs.] [In English: Swedish summary].

A bacterium-free aqueous filtrate is prepared from *Br. abortus* cultures by freezing, thawing, grinding, extracting and filtering. The filtrate can be concentrated by adsorption with  $Al(OH)_3$  or by ultrafiltration, and gives highly-specific complement-fixation reactions. When injected intradermally into infected g. pigs or cattle the filtrate causes an allergic response, as evidenced by increase of skin measurements, which compares favourably with that given by other extracts, e.g. those used by DUBOIS [*V.B.* 6. 403]. In normal animals no increase in measurements occurred. Injection of the preparation into normal g. pigs did not cause a positive agglutination reaction.—P. S. WATTS.

FOSHAY, L., & LE BLANC, T. J. (1987). **The Derivation of an Index Number for the Opsonocytaphagic Test.**—*J. Lab. clin. Med.* 22. 1297-1300. 1 fig. [2 refs.]

In Huddleson's [*V.B.* 8. 648.] brucella opsonocytaphagic test the polymorphonuclear-leucocytes are divided into four groups, viz, those showing no phagocytosis, those containing from 1-20 bacteria, those showing 21-40 bacteria, and those showing 41 bacteria or over. This method is clearly cumbersome. The authors therefore set out to reduce the classification to terms of a single

figure. They give to the class of cell showing no phagocytosis a figure of  $-2$ , to the class showing phagocytosis of 1-20 a figure of  $-1$ , to the class showing phagocytosis of 21-40 a figure of  $+1$ , and to the final class a figure of  $+2$ . Fifty cells are examined and classified; the numbers in each class are then multiplied by the respective figures with due regard to sign and the total evaluated. This figure must clearly fall between  $-100$  and  $+100$ . To obviate the necessity of using a  $+$  or  $-$  sign the  $-100$  to  $+100$  range is transformed by a simple process to a range of 0 to 100,  $-100$  becoming 0 and  $+100$  becoming 100. Actual examples are given, and a nomogram is provided for the final transformation.

This method of deriving an index number should prove of considerable value to those using the opsonocytophagic test.—F. W. PRIESTLEY.

VELLISTO, E. (1938). "Agglutinationsreihe", "Zonen (Abschnitte) der Agglutinationsreihe", "Agglutinationsgefälle der Titerzone". [**Agglutination Zones**].—*Eesti loomaarstl. Ring.* **14**. 150-159. 4 tables. [In German].

This is a discussion, based on the general publications available, about the agglutination test with regard to the interpretation of the reaction and the significant titres.—ELFRIDE RIDALA (TARTU).

LUCREZI, G. (1937). Sul potere fagocitario del sangue dei tubercolotici verso le brucelle. [**Phagocytic Action of Blood of Tuberculous Persons on Brucella**].—*G. Batt. Immun.* **18**. 643-656. 1 table. [Numerous refs.] [English, French and German summaries].

L. made an attempt to ascertain whether the blood of human beings affected with TB. would show any phagocytic action on brucella. The blood of one patient was found to agglutinate *Br. melitensis*, but blood from this patient showed no greater phagocytic power to *Br.m.* than did blood which did not agglutinate the organism.—A. J. CASSAR.

VAN SACEGHEM, R. (1939). Action virulicide des ganglions lymphatiques. [**Bactericidal Action of the Lymph Nodes**].—*Ann. Méd. vét.* **84**. 67-68.

Three young bovines inoculated intramuscularly with 0.5 c.c. of a virulent culture of *Clostridium chauvoei* manifested strong local and systemic reactions. When, however, the same dose of the culture was inoculated directly into the exposed prescapular lymph node of another bovine animal, there was no reaction of any kind; when this animal was inoculated intramuscularly with 0.5 c.c. of the culture 15 days later there was only a slight local reaction. The significance of these findings in connexion with immunity in general is briefly discussed.—N. J. SCORGIE.

HERTZOG, A. J. (1938). The Phagocytic Activity of Human Leucocytes with Special Reference to their Type and Maturity.—*Amer. J. Path.* **14**. 595-609. 6 figs. on 1 plate, 1 table. [18 refs.]

*In vitro* tests with serum from patients affected with leukaemia, infectious mononucleosis, lymphocytosis and eosinophilia indicated that the greatest amount of phagocytosis was shown by mature polymorphonuclear neutrophils. Monocytes, eosinophiles and metamyelocytes were also actively phagocytic. The phagocytic activity of myelocytes, promyelocytes, leukoblasts and myeloblasts was greatest in the more mature forms. Phagocytosis was observed only in a small percentage of mature lymphocytes. These results show that phagocytosis is a process not confined to any one type of cell; certain cells such as eosinophiles and

lymphocytes which ordinarily are not phagocytic may become so under certain conditions. The maturity of the cell is an important factor in determining its phagocytic ability.—N. J. SCORGIE.

MARRACK, J. (1939). **The Nature of the Combination between Antibodies and Antigen.**—*IV Congr. int. Pat. Comp., 1939.* 1. 331-350. 5 tables. [Numerous refs.] [In English: French, German, Italian and Spanish summaries]. [Abst. from author's summary].

The reaction between antigens and antibodies results from the specific affinity of certain specific "determinant" groups in the antigen molecules for certain specific receptor groups in the antibody molecule. This affinity is due to intermolecular forces, similar to those binding molecules together in crystals and molecular aggregates. The specificity of this affinity is determined by:—(1) the presence of atoms or groups of atoms with appropriate electric fields of force forming active points of attraction, and (2) the proper spatial distribution of these active points.

TOMCSIK, J. (1939). **Funktion der kombinierten Antigene.** [**Function of Combined Antigens**].—*IV Congr. int. Pat. Comp., 1939.* 1. 437-441. [In German: English, French, Italian and Spanish summaries]. [Abst. from author's summary].

In vaccination with associated antigens some difficulties may arise on account of the fact that the maximum of antibody concentration against each individual antigen may be reached at different times. Many simple vaccines must consist of a combined antigen, since the bacterial cell is the result of several antigenic substances. Non-specific factors have a very large influence on antigen function; and many divergencies in the work of different observers is due solely to an incomplete consideration of these factors.

PETIT, M. (1938). **Cuti-immunité et cutivaccination dans les espèces animales.** [**Skin Immunity and Skin Vaccination in Animals**].—*Thesis, Alfort.* pp. 86. [Numerous refs.]

The different forms of general immunity are described and the histology and physiology of the skin briefly outlined.

Immunization by inoculation of the skin is then discussed in general terms, the following points being considered:—mechanism, technique, rapidity of immunity and its duration, advantages and disadvantages of the skin route, and local cutaneous curative treatment by antiviral.

The second part of the thesis deals with cutaneous vaccination against coccidial infections, tuberculosis, swine erysipelas, brucellosis, blackleg, foot and mouth disease, pox, rinderpest and contagious ecthyma.

## DISEASES, GENERAL

HALDANE, J. B. S. (1938). **Congenital Disease.**—*Lancet.* 235. 1449-1455. 9 figs., 2 tables. [Numerous refs.]

This is a general exposition on the subject of congenital disease. H. deals with the question mainly from the genetical aspect, and includes many human pedigrees to illustrate his points. He calls attention to the need for studying the nature of the diathesis in cases of irregular inheritance, and suggests that very

important additions to the knowledge of the subject might be made by the investigation of embryos and miscarriages in cases where obscure abnormalities are at present vaguely described by the word "degeneracy". For example, in the case of certain feet and eye defects in mice, it has been shown that among the progeny of abnormal parents every embryo was abnormal, even if it grew up into a normal mouse. He ends with a plea for a fuller appreciation of the study of genetics in the medical curriculum.—N. J. SCORGIE.

CACCAVELLA, A. (1988). Prime osservazione sulle infezioni degli animali domestici dell'Uollega.—*Profilassi—Entomologia*. [Notes on Animal Diseases in Abyssinia].—*Nuova Vet.* 16. 104-109. 2 tables.

C. discusses his observations made during a three months' stay in the Lekemti area, Abyssinia.

The most important disease is rinderpest, and it is often complicated by piroplasmosis.

He describes his experiences with rinderpest serum and considers that simultaneous serum-virus immunization is the most satisfactory method. He discusses dipping for the control of piroplasmosis.

The following is a check-list of conditions noted in this area:—rinderpest, piroplasmosis due to *Babesia bigemina* and *B. bovis*, *Theileria mutans* infection, *Nuttallia equi* infection and trypanosomiasis caused by *Tryp. brucei* and *Tryp. theileri*. The following helminths were also found:—*Fasciola hepatica*, *Cysticercus bovis*, *Ascaris megalocephala*, and species of strongyles. Demodectic and sarcoptic mange, *Tyroglyphus* infestations, and ringworm due to *Trichophyton* occurred. Species of *Amblyomma*, *Rhipicephalus* and *Boophilus* were found as well as *Glossina morsitans* and species of *Chrysops*, *Haematopota*, *Stomoxys* and *Sarcophaga*.

GÖTZSCHE, N. O., & PLUM, N. (1988). "Skin lesions"—Problem. 'Tuberkulose-lignende Knuder i Subkutis hos Kvaeg. [The Skin Lesion Problem. Tuberculosis-Like Nodules in the Subcutis of Cattle].—*Maanedskr. Dyrlaeg.* 50. 33-54. 6 figs. [18 refs.]

Skin lesions or tuberculoid processes in the subcutis of cattle as reported in America had not been reported in Denmark before 1986. In 1986, however, ANDERSSON [V. B. 9. 142.] reported an increasing number of cases of "skin tuberculosis" in cattle since 1980 in his district on the Isle of Gotland (Sweden), and 100 typical cases were recorded in 1987. He gave an account of the infection and showed how it spreads from herd to herd when the animals are kept on common pastures.

Because of its importance for the control of bovine TB., the authors went to Gotland to study the disease, and more especially its relation to the tuberculin test. They found that (1) about 50% of the clinically affected animals reacted positively to the intradermal tuberculin test, (2) some animals with no clinical symptoms reacted positively to the test, (3) the allergic condition once established disappeared gradually, (4) the power to react diminished with repeated tests, (5) bovine tuberculin showed a slight superiority over the human type in duplicate tests applied at the same time, (6) few positive reactors to the intradermal test reacted to the subcutaneous test, and (7) that the ophthalmic test with bovine and avian tuberculin in no case gave positive reactions.

It is concluded that cattle affected with "skin lesions", as it occurs in its typical form on the Isle of Gotland, react to tuberculin tests but not in the same manner in which animals react when infected with the bovine, human or avian type of tubercle bacilli.—GUSTAV NAERLAND (OSLO).

- I. GIRON, A. T. (1987). Los murciélagos, portadores del virus de derriengue. (Encéfalo-mielitis bovina). [**Derriengue (Bovine Encephalomyelitis) and Its Transmission by Bats in Mexico**].—*Rev. mex. Med. vet.* 1. No. 5. 6-8.
- II. GIRON, A. T., & CAMARGO, F. (1988). Investigaciones en el derriengue. [**Encephalomyelitis in Cattle in Mexico**].—*Ibid.* 2. No. 18. 3-5. [18 refs.]

I. G. states that there are increasing numbers of losses among cattle due to the spread of this disease in Mexico. He succeeded in transmitting the infection from bovines to laboratory animals and *vice versa* by means of nervous tissue (intranasally and intraocularly); saliva from affected cattle also proved infective for laboratory animals. He produced infection in g. pigs by inoculation with brain suspension of bats taken from an affected area, and believed to be of the genera *Macrotus* and *Artibeus*. G. suggests that there is some hope that the disease may be combated by vaccination, and also that an attempt may be made to exterminate the bats, should they prove to be the vectors of the disease.

II. This is a brief summary of the data obtainable on this condition. The symptoms are described [see also *V. B.* 6. 805-806]. The infective nature of the disease has been proved experimentally; the incubation period in rabbits is six to eight days. Several strains of the virus have been isolated. Pigeons cannot be infected, but the dog is susceptible. Bodies resembling Negri bodies are demonstrable. In an outbreak at Pinotepa a number of horses were affected. Rabbits were infected by inoculation with material from the brain of infected bats; the authors suggest that the disease is transmitted by the saliva of bats to domestic animals, *i.e.* domestic animals do not infect one another. [The disease would appear to have close resemblance to the bat-transmitted rabies seen in South America; see *V. B.* 4. 33].

- MIESSNER, H., & HARMS, F. (1939). Zur Frage des Virusabortes der Stuten. [**Virus Abortion in Mares**].—*Z. InfektKr. Haustiere.* 54. 281-284. [2 refs.]

A reply to OPPERMAN [V. B. 9. 568.] and a criticism of his theory that abortions in the mares discussed in that article were of nutritional origin. [No further evidence in favour of the virus theory is advanced: it is regrettable that the term "virus abortion" has been used in the literature on the cases under discussion].—J. E.

- AYCHET, M. (1988). Une des entérites toxiques des agneaux. (La paraplégie enzootique). [**Enzootic Paraplegia, a Toxic Enteritis, in Lambs**].—*Thesis, Alfort.* pp. 71. [Numerous refs.]

A. describes a disease in lambs which occurs in France and has been recorded by French writers under such names as meningo-encephalitis and epizootic cerebrospinal meningitis. He suggests that the condition is an enteritis with auto-intoxication. It has a high mortality; it does not appear to be infectious, or directly due to parasites. Symptoms are varied but the passage of unformed faeces coated with mucus, pain on abdominal palpation and straining are characteristic. These symptoms may be combined with those of cerebral or locomotor disorders. Staphylococcal pustules are often present on the skin. P.M. findings include some degree of enteritis with much mucus and desquamated epithelial cells in the rectum, and distension of the rumen.—A. A. B. ELLIS.

- CARSTENS, P., & PRÜFER, J. (1988). Abschliessende Untersuchungen über Verkrümmungen des Brustbeins beim Huhn, insbesondere die experimentelle Erforschung ihrer Erbllichkeit. [**Curvature of the Sternum in Fowls; the Hereditary Aspect**].—*Arch. Geflügelk.* 12. 78-94. 6 figs., 6 tables, 2 charts. [8 refs.] [English summary]. [See also *V. B.* 8. 598].

Experiments were carried out on 580 Leghorn fowls aged six months to four years, kept in fowl houses with perches. New cases of curvature of the sternum occurred at all times within this period. The incidence was higher in heavy birds. This condition has no adverse effect on egg-laying, development, general health, length of life or fertility and should not be considered as a constitutional weakness.

K. describes matings between an unaffected cock and seven affected hens ; he considers that this experiment gave evidence in support of the inheritance theory.—SASSENHOFF (MÜNICH).

FRITZSCHE, K. (1937). Ueber eine durch Aetzkalkverstäubung hervorgerufene hämorrhagische Laryngotracheitis des Huhnes. [**Haemorrhagic Laryngotracheitis in Fowls Caused by the Scattering of Quick Lime**].—*Berl. tierärztl. Wschr.* 53. 607-609. 4 figs. [5 refs.]

Quick lime was scattered on land occupied by poultry with the result that many chickens died of acute laryngotracheitis, the clinical symptoms of which resembled the virus disease of this name.

Differential diagnosis was made by histological examination of the affected tissue, which in lime injury shows much exudate attached to the mucosa and extreme congestion of the capillaries of the latter. In laryngotracheitis there is intense cellular infiltration.—V. CHLÁDEK (PRAGUE).

LUBBEHUSEN, R. E., & BEACH, J. R. (1939). **Adult Poultry Mortality of Non-Infectious Origin**.—*J. Amer. vet. med. Ass.* 94. 209-222. 8 tables. [1 ref.]

The authors draw attention to the significance of diseases of poultry other than those of infectious origin, and their effect upon egg production on the incidence of culls (birds to be got rid of), and on their relation to mortality rates. They analyse the results of an experimental study carried over several years, with special reference to the age incidence of pathological lesions.

The birds used for these studies comprised four age groups, hatched in the April of each year from 1933-1936. The brooding conditions were ideal, and the percentage of deaths from infectious diseases was negligible. The birds were culled at 16 months, 19 months and 22 months. Birds placed on nutrition experiments, the basal rations of which were believed to supply normal requirements, were autopsied at 27 months. All culls were submitted for *ante-mortem* examination, so that records of symptomatology could be made. The autopsy data is summarized at six-monthly intervals.

During the age period of 7-12 months, in a total of 4,278 birds, the combined population of the four series during this age period, the mortality was 295 (6.9%). At P.M. examination in birds that died, lesions of visceral lymphomatosis or of lymphoid leukosis were demonstrated most frequently, followed by those of the alimentary, reproductive and urinary systems respectively. In the culls, lymphomatous infiltrations involving either the visceral organs or the nervous system represented 35.8% and 29.4% of the total respectively. Those of the alimentary, reproductive, urinary and miscellaneous groups occurred less frequently.

In the second age period of 13-18 months the average mortality was 19.8%. 988 primary pathological lesions were observed ; 34.9% affected the reproductive system, 18.8% the alimentary system and 17.1% occurred as visceral lymphomatosis. 105 of the 117 lesions affecting the urinary system occurred in birds which died, whilst 41 of the 71 neurolymphomatous lesions were observed in the culls.

The mortality during the age period of 19-24 months was 11.5%. Lesions

of the reproductive system predominated (88.2% of 556 primary lesions); 24.7% were demonstrated in the alimentary system, and 16% in the urinary system; visceral lymphomatosis amounted to 14.8%. The relative incidence of various lesions in culled birds and birds which died is specified in full. In the age period of 25-80 months the mortality was 17%. Lesions of the reproductive system predominated, followed by those of the alimentary and urinary systems; lesions of visceral lymphomatosis were observed less frequently. The period of 81-86 months showed a mortality of 20%, the lesions predominating in the same relation as in the preceding period.

In the author's opinion, lesions of the reproductive system were directly responsible for unsatisfactory egg production among the birds culled at 16 months. The authors point out that control of infectious diseases is not in itself sufficient to reduce the high incidence of mortality, and the need for further study of genetic, nutritional and general husbandry factors is indicated.—C. V. WATKINS.

BESREDKA, A., & GROSS, L. (1939). Epithélioma expérimental de l'estomac. Immunisation par voie intracutanée. [**Experimental Brown-Pearce Epithelioma in the Stomach. Immunization by Intradermal Inoculation**].—*Ann. Inst. Pasteur*. **62**. 258-259. 1 fig. [4 refs.]

It was found possible by injection into the stomach wall of rabbits of a fresh emulsion of Brown-Pearce carcinoma to induce in all cases a malignant tumour which in 18 animals gave rise to metastases. The region selected was the prepyloric area and the lesser curvature. This type of tumour has now been successfully implanted in the stomach, skin, subcutaneous tissues, peritoneum, testes, eye and brain of rabbits.

The fact that the regression of a particular type of tumour is usually followed by a high degree of resistance to the development of a further tumour of the same type, led the authors to try the effect of the injection of tumour emulsions into the stomach wall of rabbits in which regression of a skin neoplasm of the Brown-Pearce type had previously occurred. In 11 out of 12 animals no neoplasm developed at the site of inoculation, whereas in 82 control rabbits which had not previously developed skin tumours followed by regression, all except one showed a carcinoma of the stomach wall.—E. G. WHITE.

STASNEY, J., & FELDMAN, W. H. (1938). **Leukemic Lymphoblastoma in a Calf: a Hematologic and Histologic Study**.—*Amer. J. Cancer*. **34**. 240-247. 5 figs. [6 refs.]

Detailed haematological studies were made for a period of three weeks on a three-months-old calf with generalized enlargement of all lymph nodes. During this period three biopsies were carried out on superficial lymph nodes; the animal was finally destroyed when extremely emaciated and a detailed autopsy was carried out.

There was a definite correlation between the immature lymphocytes found in the peripheral blood and the cellular picture in the diseased lymph nodes. At autopsy, proliferation of cells (lymphocytes and reticulum cells in varying proportions) was found in the lymph nodes, liver, spleen and bone-marrow. The histopathological picture was similar to that seen in lymphatic leucaemia in man and indicated a neoplastic process in which secondary invasion of the blood had occurred. In addition, in some of the lymph nodes the changes were suggestive of lymphosarcoma. The term "leucaemic lymphoblastoma" is put forward as most suitably describing the condition.—E. G. WHITE.

Buss, W. (1988). Leukämie bei einem Kalb. [*Leucaemia in a Calf*].—*Tierärztl. Rdsch.* **44**. 785-786.

Records of leucaemia in the calf are rare. In the case described, lesions were found in the liver and myocardium in addition to involvement of all the lymph nodes.—E. G. WHITE.

McINTOSH, J., & SELBIE, F. R. (1989). Further Observations on Filterable Tumours Induced in Fowls by Injection of Tar.—*Brit. J. exp. Path.* **20**. 49-63. 8 text figs., 27 figs. on 6 plates, 2 tables. [16 refs.]

An extension of previous work by McINTOSH [(1989). *Brit. J. exp. Path.* **14**. 422.], and the history is given in detail of the tar-induced tumours in fowls mentioned in that paper. The authors induced four new tumours by the injection of tar into the breast muscles of Plymouth Rock hens. Two of these were transmitted repeatedly in serial passage by Berkefeld filtrates; one, a non-filtrable tumour, could be passed by means of emulsions and another by means of minced tissues only.

The histological and biological characteristics and the filtrability of the various original tar tumours and their passage tumours are described in detail; the histological description is aided by the use of numerous plates; biological characteristics given include the transmissibility, rate of growth, tendency to form metastases, etc.

The authors conclude from their work that an active virus can be demonstrated in a large proportion of chemically-induced, connective-tissue tumours in the fowl.

—L. E. HUGHES.

## NUTRITION IN RELATION TO DISEASE

I. ASKEW, H. O. (1989). Cobalt Deficiency at Glenhope, Nelson, New Zealand.—*N.Z. J. Sci. Tech.* **20**. 802A-809A. 1 fig., 6 tables. [4 refs.]

II. ASKEW, H. O. (1989). Successful Use of Cobalt Salts for Pasture Topdressing in the Treatment of Stock Ailment at Glenhope, Nelson.—*Ibid.* **815A-818A**. 1 fig., 8 tables. [2 refs.]

I. This paper records further work on bush sickness at Glenhope, Nelson. In groups of hoggets receiving acid extracts and iron-free extracts of Nelson soil, and cobalt drench, the onset of bush sickness was prevented. Control sheep, however, and a fifth group receiving hydrochloric acid, developed the disease and a number succumbed. It was concluded that bush sickness on the granite-derived soils at Glenhope is due solely to a deficiency of cobalt.

The results of blood examinations, analysis of drenches, cobalt status of pastures and livers are given.

II. Bush-sick sheep were restored to health and were subsequently maintained in health for an extended period when "depastured" on a previously "sick" area which had been topdressed annually with cobaltized superphosphate, providing 2 lb. cobalt chloride per acre. The cobalt content of the pasture was markedly increased by the application of cobalt chloride at the above rate. Chemical data for cobalt in the case of a pasture on the Marsden Research Farm treated with cobalt chloride at the rate of 4 ounces per acre suggest that the 2 lb. application used in the experiment was unnecessarily large and probably could be reduced with safety.—L. W. N. FITCH.

HOVE, E., ELVEHJEM, C. A., & HART, E. B. (1988). Arsenic in the Nutrition of the Rat.—*Amer. J. Physiol.* **124**. 205-212. 5 tables, 1 chart. [16 refs.]

Experiments on the effect of As upon nutritional anaemia of rats show that

if As is essential during the rapid growth period or for Hb building, the requirement is met by the 2γ per day, furnished by 50 ml. milk, and that addition of As at levels of 1 and 5γ per day had no effect on growth, Hb levels, R.B.C. levels or blood fragility of rats on a mineralized milk diet.—ALFRED EDEN.

- I. LYONS, M., INSKO, W. M., Jr., & MARTIN, J. H. (1988). **The Effect of Intraperitoneal Injections of Manganese, Zinc, Aluminium and Iron Salts on the Occurrence of Slipped Tendon in Chicks.**—*Poult. Sci.* 17. 12-16. 3 tables. [Numerous refs.]
- II. CLIFCORN, L. E., ELVEHJEM, C. A., & HART, E. B. (1988). **The Development of a Ration for the Study of Perosis in Chicks.**—*Ibid.* 28-32. 3 tables. [9 refs.]
- III. WIESE, A. C., ELVEHJEM, C. A., HART, E. B., & HALPIN, J. G. (1988). **Studies on the Prevention of Perosis in the Chick.**—*Ibid.* 33-37. 2 tables. [9 refs.]

I. With the diet used the intraperitoneal injection of 12.9-30.9 mg. of manganese to day-old chicks over a period of seven weeks prevented slipped tendon, whereas the injection of similar quantities of zinc, aluminium and iron had no protective action. Retardation of growth resulted in the case of chicks receiving 30.9 mg. manganese, but those injected with 15.45 mg. showed some increase in growth rate over the control and other injection groups. Zinc caused some retardation in growth at all levels of injection.

II. Experiments to find a satisfactory basal ration for the production of perosis in chicks led to the adoption of one consisting of 69 parts kidney-dextrin mixture, 14 parts crude casein, 2 parts brewers' yeast, 2 parts cod-liver oil, 3 parts  $\text{Ca}_3(\text{PO}_4)_2$ , 5 parts alcoholic extract of rice bran, and five parts of a salt mixture. The addition of the alcoholic extract of rice bran was necessary for the prevention of encephalomalacia.

III. The addition of 15% of rice bran to the basal ration [described in II above] completely prevented perosis in chicks, as also did the addition of a 0.0025 and 0.005% of manganese, but with another ration containing higher levels of Ca and P, 15% of rice bran and the addition of 0.005%, 0.0025% and 0.05% of manganese were ineffective. The perosis-preventing factor in rice bran was destroyed by autoclaving, and was not extracted by 95% alcohol, 1%  $\text{H}_2\text{SO}_4$ , or concentrated glycerol.

The inorganic and ester P of the blood of chicks on the basal ration was unchanged, but the total blood P of the chicks on the ration plus manganese was lower than that of chicks on the basal ration alone or of those receiving the rice bran supplement.—R. ALLCROFT.

- WIESE, A. C., JOHNSON, B. C., ELVEHJEM, C. A., HART, E. B., & HALPIN, J. G. (1989). **A Study of Blood and Bone Phosphatase in Chick Perosis.**—*J. biol. Chem.* 127. 411-420. 4 tables, 2 charts. [20 refs.]

The average blood and bone phosphatase activity of chicks with perosis was 8.3 and 4.7 units respectively while that of non-perotic birds was 22.6 and 9.1 units respectively. Chicks fed on the same perosis-producing diet but with a supplement of 50 p.p.m. of Mn did not develop perosis and had an approximately normal phosphatase activity as compared with the phosphatase activity of chicks fed a normal grain ration. When a diet high in Ca salts other than the phosphate was fed, the phosphatase activity was lowered and a high incidence of perosis occurred, but the decreased activity was not as great as when high amounts of inorganic P were fed.

From *in vitro* experiments it was observed that the addition of  $\text{PO}_4$  or Ca ions to the enzyme markedly decreased its activity, and addition of Mn restored the activity, but this activation depends on the amount of Mn and  $\text{PO}_4$  ions present; the higher the  $\text{PO}_4$  concentration the more Mn is necessary to activate the enzyme.

The phosphatase activity was estimated by a slight modification of the method of King and Armstrong.—R. ALLCROFT.

- I. KRUPSKI, A. E., HUNGERBÜHLER, F., & ALMASY, F. (1987). Untersuchungen über den Calcium-Phosphorstoffwechsel lecksüchtiger Tiere der Braunviehrasse und über therapeutische Erfolge mit Vitamin D. III Mitteilung. [Ca : P Ratio of Swiss Brown Cattle with Pica; Treatment with Vitamin D. III.]—*Schweiz. Arch. Tierheilk.* **79**. 355-368. 1 table, 1 chart. [11 refs.] [See also *V. B.* **7**. 631].
- II. KRUPSKI, A. (1988). Beitrag zur Frage der klinischen Anwendung des D-Vitamins. [The Use of Vitamin D in Veterinary Medicine].—*Ibid.* **80**. 307-316. 2 figs., 1 table.

I. A slight variation in the Ca content of the blood serum and a fall in the inorganic P to a third of the normal ratio were found in animals affected with pica. In 24 hours' excretion of urine of an affected cow, the urine P content was 40 times higher than normal; in another cow equally affected there was no variation in the urine P content. With one exception, all animals treated intravenously with a vitamin D preparation recovered, and lactation increased. After six days' vitamin treatment a retention of 62 g. of Ca and of 54 g. of P was observed. Simultaneously with the diminution of the symptoms of pica the animals regained their normal sexual cycle, having lost it during illness.

II. Bovines 6-18 months old stunted and affected with pica, osteomalacia and osteoporosis, recovered their general health after two intravenous injections of 600,000 international units of vitamin D, at an interval of 3-5 weeks. Older animals were given up to one million I.U. The vitamin treatment should be accompanied by a bone-meal or a mineral salt ration and grazing in sunlight and fresh air.—HANS GRAF (ZÜRICH).

DANCKWORTT, P. W., & HOTZEL, J. (1937). Chemische Untersuchungen von Heuproben aus Lecksuchtgebieten. [Analysis of Hay from Pica Areas].—*Dtsch. tierärztl. Wschr.* **45**. 701-705. 1 tables. [Numerous refs.]

The authors analysed 19 samples of hay from pica areas in Schleswig-Holstein, comparing them with good meadow hay from Hanover. A table shows the results of the tests for ash,  $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$ , Fe, Al, Ca, Mg, P and Cl. The pica area hay did not differ from the Hanover hay appreciably, only having a low Ca content in some cases (0.15% as against 0.5%).

In a further test the Cu content of the hay was estimated, but no apparent deficiency was found (0.36-1.19 mg. %); the same applied to the S content.

Tests for organic matter are also described, but were judged to be unsatisfactory as the hay samples had become dry and pulverized.—J. E.

KUIVER, H., & KAARDE, J. (1988). Ulevaade senistest uurimistest veiste soohaiguse selgitamiseks. [Research on Pica in Cattle in Estonia].—*Eesti loomaarstl. Ring.* **14**. 33-70. 8 tables. [Numerous refs.] [German summary].

The problem of pica in cattle became of pressing importance following the formation of new land settlements on moorland; the disease had, however, formerly been observed in the older established farms elsewhere. One affected cow which was purchased for observation was killed and the following pathological

changes were seen :—chronic catarrhal abomasitis and enteritis, fatty degeneration of the liver and obstructive jaundice, congestion of the kidneys, hypertrophy of the heart muscle, and atrophy of the thyroid gland.

Soil and water from the affected area were analysed, but no particular mineral or other deficiency was ascertained, though mineral deficiency in general was suspected.—ELFRIDE RIDALA (TARTU).

BRADFIELD, DOROTHY, & SMITH, MARGARET C. (1938). **The Ability of the Dog to Utilize Vitamin A from Plant and Animal Sources.**—*Amer. J. Physiol.* **124**. 168-173. 1 table. [1 ref.]

An experiment is reported from which it appears evident that vitamin A fed as cod-liver oil, or as its precursor, carotene, in oil or as carrots, is almost equally well utilized by the dog. A level of 20 international units of vitamin A per 100 g. body weight, either from animal or vegetable sources, appeared ample for normal growth in puppies and permitted slight storage in the liver. Greater intakes of vitamin A resulted in proportionately greater storage. At the high levels of intake there was no weight gain advantage in the puppies but their general condition was better. The minimum vitamin A requirements of the dog are estimated at 15 I.U. per kg. body weight.—N. J. SCORGIE.

LAMOREUX, W. F., & HUTT, F. B. (1939). **Breed Differences in Resistance to a Deficiency of Vitamin B<sub>1</sub> in the Fowl.**—*J. agric. Res.* **58**. 307-316. 2 figs., 1 table. [10 refs.]

In each of four experiments the ability of White Leghorn chicks to survive on a diet deficient in vitamin B<sub>1</sub> was greater than that of Rhode Island Reds. The mean age at death was lowest for chicks which never received any normal feed and highest for those which had been on normal feed to two and three weeks of age, but in each experiment the mean age at death was higher for the White Leghorns than for the Rhode Island Reds. Also the variation in susceptibility among individuals, as measured by the range in age at death, was much greater in the former than in the latter. The superior resistance of the White Leghorns to this dietary deficiency was shown to be independent of body size and was not caused by differential mortality from causes other than polyneuritis.—R. ALLCROFT.

DAM, H., GLAVIND, J., BERNTH, O., & HAGENS, E. (1938). **Anti-Encephalomalacia Activity of *dl*- $\alpha$ -Tocopherol.** [Correspondence].—*Nature, Lond.* **142**. 1157-1158. [3 refs.]

Daily doses of *dl*- $\alpha$ -tocopherol, increasing proportionally to the weight of the animals in quantities of 0.0075 mg. per g. body weight per day, completely protected chicks against encephalomalacia. In another experiment in which a basal diet containing less fat was used, it was observed that the growth of the chicks was stimulated by addition of *dl*- $\alpha$ -tocopherol. Several authors agree that there is a fat-soluble and a water-soluble form of the anti-encephalomalacia factor and from the experimental observations it seems that the fat-soluble form is either identical with, or may be substituted by, the synthetic vitamin E: further it should be possible to standardize vitamin E in fats by means of the anti-encephalomalacia activity.—R. ALLCROFT.

THOMAS, B. H., & CANNON, C. Y. (1937). **Reproduction on Rations Free from Vitamin E.**—*Proc. Amer. Soc. Anim. Prod.* **1937**. pp. 59-68. 1 table.

Seven goats and their progeny were fed on a ration adequate in all respects except for vitamin E for 4½ years, during which period no unusual difficulty was

experienced in expanding the original herd of seven to 48. Since all matings were successful in producing young it is concluded that neither male nor female goats require vitamin E in the ration to ensure reproduction. But male rats reared on the same ration were completely sterile at 7 and 8 months of age, while the female rats went through initial resorption gestations typical of vitamin E deficiency.—R. ALLCROFT.

ALMQUIST, H. J., MECCHI, E., & KLOSE, A. A. (1938). **Estimation of the Anti-haemorrhagic Vitamin.**—*Biochem. J.* **32**. 1897-1903. 1 fig., 4 tables. [6 refs.]

Data are presented which show that the blood-clotting time of the chick varies with the age and the vitamin K reserve in the chick, and the vitamin K level in the ration, and tends to reach a maximum at two weeks of age; at 3 weeks of age the chick achieves a balance of blood-clotting power with respect to the vitamin K level in the ration.

An improved assay procedure for vitamin K is suggested.—R. ALLCROFT.

## PUBLIC HEALTH

SCHMIDT, J. (1936). Erkrankungen bei Menschen nach Genuss von Milch einer euterkranken Ziege. [**Illness in a Family Drinking Milk from a Goat with Mastitis**].—*Berl. tierärztl. Wschr.* **52**. 438-439.

A whole family was taken ill with gastro-intestinal symptoms after drinking coffee containing milk from a goat with a mixed infection of staphylococci and streptococci. It is supposed that preformed toxin was the cause.—P. S. WATTS.

FLEISCHHAUER, G., & HERMANN, G. (1938). Ueber weitere Erfahrungen mit der Abortus-Bang-Ringprobe (ABR.) bei der Untersuchung von Milchproben auf Abortus Bang. [**The Ring Test for the Diagnosis of Brucella Infection in Milk**].—*Berl. tierärztl. Wschr.* June 10th. 333-334. [5 refs.]

A comparison of the ring agglutination test with the standard tube and slide methods for the diagnosis of brucella infection in milk. [It cannot be stressed too strongly that these tests do not give any certain indication of the presence or absence of infection in milk. Such tests merely indicate that the cows producing the milk are strong positive reactors to the agglutination test and that it is probable that a proportion of them may be infected with *Br. abortus* in the udder].—E. J. P.

## THERAPEUTICS

- I. NEUMANN, C. Z. (1938). **Treatment of Undulant Fever with Prontosil.**—*Brit. med. J.* Aug. 13th. 342-344. 1 table.
  - II. DALRYMPLE-CHAMPNEYS, W. (1938). **The Prontosil Group in *Br. abortus* Infections.** [**Correspondence**].—*Ibid.* Aug. 27th. 471.
  - III. ANON. (1938). **Sulphanilamide in Undulant Fever.**—*Lancet.* **235**. 901. [6 refs.]
  - IV. BRITTON, C. J. C. (1938). **The Effect of Sulphonamide Compounds on Certain Bacteria in vitro.**—*Brit. J. exp. Path.* **19**. 140-143. 2 tables. [1 ref.]
  - V. WELCH, H., WENTWORTH, J. A., & MICKLE, F. L. (1938). **The Use of Sulfanilamide in the Diagnosis and Treatment of Brucellosis.**—*J. Amer. med. Ass.* **111**. 226-281. 3 figs., 3 tables. [11 refs.]
- NEUMANN found that in cases infected with *Br. melitensis* and which had been

treated with prontosil *per os*, the average duration of the fever was seven days (except in one case in which the drug was ineffective). Untreated cases become free of fever in 2-6 months. DALRYMPLE-CHAMPNEYS obtained beneficial effects in half of his cases of *Br. abortus* infection treated with prontosil or sulphanilamide. MONTGOMERIE [*V. B.* 8. 729.] in Britain and CHINN [*V. B.* 9. 338.] in the United States have both reported favourably on the effect of sulphanilamide treatment in g. pigs experimentally infected with *Br. a.* or *Br. suis*. BRITTON could demonstrate no deleterious effect of sulphanilamide on *Br. a.* *in vitro*. WELCH, WENTWORTH and MICKLE, however, found that in human beings suffering from undulant fever and in g. pigs infected with *Br. a.* the phagocytic activity of the white blood cells is increased by the administration of sulphanilamide, and believe that the drug stimulates the opsonic power of the blood.—J. M. ROBSON.

- I. VELU, H., ZOTTNER, G., & BELLE, G. (1938). Le naganol peut être employé sans danger dans la prophylaxie de la dourine. [**Use of Naganol in the Prophylaxis of Dourine**].—*Arch. Inst. Pasteur Algér.* 16. 389-402. [2 refs.]
- II. COLIN. (1938). Contribution à l'étude de la dourine ; son traitement par le novarsénobenzol billon. [**Treatment of Dourine by Novarsenobenzol Billon**].—*Bull. Acad. vét. Fr.* 11. 177-180. [4 refs.]
- III. CORDIER, G., & MÉNAGER, J. (1938). Le novarsénobenzol dans le traitement de la dourine. [**Treatment of Dourine with Novarsenobenzol**].—*Bull. Soc. Path. exot.* 31. 490-493.

I. After complaints that the prophylactic injection of naganol (0.0035 g. per kg. body weight) at ten days' interval caused serious trouble among native asses in Morocco, the authors submitted Moorish donkeys to repeated doses of the drug ranging from 0.0035 g. to 0.14 g. per kg. body weight. At the same time they kept the urine and blood under observation, noting especially the changes in the sugar and albumin contents ; the results are recorded, together with the results of P.M. examination of the kidneys.

With the lower doses, even after 86 injections, no harmful effect was to be observed clinically, but a transient hypochloruria and albuminuria were noted. The large doses caused more serious renal trouble, indicated by pronounced albuminuria and hypochloruria, which eventually caused death.

II. As judged by apparent return to health and by the formol gel test, two clinically diagnosed cases of dourine in stallions weighing 440 and 370 kg. were cured by the intravenous injection of 15 g. novarsenobenzol, given as a 0.1% solution on two successive days. The daily dose was divided into three parts and given at intervals of half an hour.

III. Novarsenobenzol is considered superior to naganol for the treatment of dourine, as only two injections are necessary, the blood is immediately sterilized, and no serious symptom of poisoning followed in two Pyrenean donkeys given therapeutic doses.—G. WILLIAMSON.

- KOLMER, J. A., & RULE, Anna M. (1939). Sulfanilamide in the Treatment of Experimental Trypanosomiasis of Rats.—*Proc. Soc. exp. Biol., N.Y.* 40. 77-79. 2 tables. [1 ref.]

Sixteen rats were each inoculated with approximately 500,000 *Trypanosoma equiperdum*. Six intravenous injections of 0.08-2 g. sulphanilamide were administered to 12 of the rats during the next 78 hours. All died of trypanosomiasis in four to five days. Three uninfected control rats which were given the same treatment survived. Similar results attended oral administration of the drug, which proved ineffective in all cases.—D. D. OGILVIE.

FAURE-BRAC. (1939). La chimiothérapie aurait-elle vaincu la leishmaniose ? [Control of Leishmaniasis by Chemotherapy].—*Bull. Acad. vét. Fr.* 12. 64-76. [5 refs.]

Canine leishmaniasis affects some 15% of dogs in the Mediterranean coastal districts of France. Of some 2,000 infected dogs treated with antimony during the previous 15 years only 2.5% of them were completely sterilized. These were all young animals treated in the primary stages of infection. Some 200 dogs showed signs of antimony intolerance and treatment was abandoned. The remainder showed improvement, but relapses occurred in from 1-14 months. Treatment with a new pentavalent antimony preparation, aminophenylstibinate, is described and it is stated that with the use of this drug larger doses of antimony can be used with less risk of accident. Local and general improvement is more rapid, the total number of injections necessary are reduced and complete cures are possible. In a series of 250 dogs which have now been treated, no local abscess formation was observed. Injections should be made every five days. The toxic dose for a dog of 20 kg. is 20 g. and the dosage recommended varies with the weight of the animal, but is less than one tenth of the toxic dose. A number of cases which were treated are described.—S. J. GILBERT.

MANWELL, R. D., & HARING, AND T. (1938). Plasmochin and Atebrin Therapy in *Plasmodium vaughani* Infections.—*Riv. Parassit.* 2. 207-218. 24 figs. on 1 plate, 4 tables. [17 refs.] [In English: French, German and Italian summaries]. [Transl. from French summary].

In observations on 53 birds inoculated with infective blood, the authors observed the striking susceptibility of *P. vaughani* to plasmochin and "atebrin"; they studied the morphological changes in the parasite.

BÉGUÉ, P. (1938). Traitement de la piroplasmose du chien par le "Zothélone." [Treatment of Canine Piroplasmosis with "Zothélone"].—*Thesis, Toulouse.* pp. 58. [Numerous refs.]

In searching for a drug which could be effectively employed against piroplasms and which would be free from the disadvantages of the agents already in use, CUILLÉ, DARRASPEN and FLORIO [*V. B.* 8. 248.] made experiments with "zothélone" [dimethylquinolylmethyl sulphate urea]. B. reports the results obtained with "zothélone" on dogs affected with *Babesia canis* infection.

The drug generally caused the piroplasms to disappear within a few hours, and at the latest within 24-48 hours. Relapses occurred, but were few. Toxic symptoms arose if, following a too concentrated dose of the drug, the parasites were destroyed too quickly. "Zothélone" could be given subcutaneously without fear of undue local reaction, and a therapeutic dose could be repeated in 24 hours if necessary. It caused no discoloration of the patient's urine. B. recommends the following subcutaneous doses:—for dogs over 10 kg., 20 c.c. of 0.025% solution; for smaller dogs, 10 c.c., and for very small dogs, 7-8 c.c. Contrary to the experience of others, B. noted no sensitization of the parasite or exaggerated reaction in the patient when these doses were repeated after a fortnight's interval.—G. W.

JÖRG, M. E. (1936). De la coccidiosis de los conejos de laboratorio. Contribución para su terapéutica. [Chemotherapy of Rabbit Coccidiosis].—*8th Reun. Soc. argent. Pat. reg. N.* 2. 1042-1051. 2 figs. [8 refs.]

J. states that he obtained good results in the treatment of rabbit coccidiosis by chinisol given *per os*. [The article is unconvincing].

RISCHMÜLLER, H. (1937). Versuche zur Behandlung verschiedener ektoparasitärer Erkrankungen bei Pferd u. Rind mit Derrophen, dem standardisierten Derrispräparat der I.G. Farbenindustrie. [**Treatment of Ectoparasitic Infestations of Horses and Cattle with "Derrophen"**].—*Inaug. Diss., Hanover*. pp. 37. 12 tables. [Numerous refs.]

R. describes in detail his tests of a derris wash on 115 horses and cattle. It was effective against both ringworm and mange, and also against lice, at a concentration of 3%; higher concentrations were not more effective. The preparation is claimed to be entirely harmless to the animals, provided it is not applied directly to mucous membranes.

HARWOOD, P. D., HABERMANN, R. T., & JERSTAD, A. C. (1939). **Efficacy of Commercial Phenothiazine in the Removal of Roundworms from Sheep.**—*Vet. Med.* **34**. 440-443. 1 fig., 1 table. [7 refs.]

Trial of this product was made upon ten cull ewes and rams shown by faecal examination to be infested with various species of round worms. After the administration, the faeces were examined daily for the presence of worms, particularly *Bunostomum* and *Chabertia*, until none was found; the animals were then killed and examined P.M. The product was given in the food and was found to be efficient when given in a dose of 0.5 g. per lb. body weight.—W. J. IRONSIDE.

BAKER, D. W., DANKS, A. G., & BRITTON, J. W. (1939). **Treatment of Trichostrongylosis in Foals.**—*Cornell Vet.* **29**. 238. 1 table.

Six foals, in which trichostrongylosis was diagnosed by faecal worm egg count and larval culture, were treated with a solution containing 1% of copper sulphate and nicotine sulphate. As determined by faecal worm egg count the treatment was shown to be highly efficient.—W. J. IRONSIDE.

BAKER, D. W. (1939). **A New System of Anthelmintic Control for Gastro-Intestinal Parasites of Ruminants.**—*Cornell Vet.* **29**. 192-197. 2 figs., 2 tables. [6 refs.]

The treatment described consists in spraying the pharynx or swabbing the mucous membrane of the mouth with a strong solution of copper sulphate and then administering a dose of a mixture of equal parts of tetrachlorethylene and mineral oil. Particulars are given of the application of the treatment to a group of seven calves, and the results as assessed by faecal worm egg counts showed that the treatment was successful.—W. J. IRONSIDE.

WEHR, E. E., HARWOOD, P. D., & SCHAFFER, J. M. (1939). **Barium Antimonyl Tartrate as a Remedy for the Removal of Gapeworms from Chickens.**—*Poult. Sci.* **18**. 63-65. 1 table. [4 refs.]

Affected chicks were made to inhale the substance by placing them in a glass jar together with the powder and keeping the powder agitated by means of bellows. Three to five chicks were treated at a time and were exposed to treatment for periods up to ten minutes. Some 140 chicks were so treated, and the results showed that the treatment was highly efficient.—W. J. IRONSIDE.

POTEMKINA, V. A. (1937). Diagnostika i terapija gimenolepidoza (*Hymenolepis lanceolata*) gusei. [**The Diagnosis and Treatment of Hymenolepidosis *H. lanceolata* Infestation of Geese.**—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skryabin*. pp. 529-541. 7 figs., 2 tables. [9 refs.] Moscow: Lenin Acad. Agric. Sci.

The authors carried out experiments to assess the value of arecolin, a product spoken of as "philitselene", male fern extract, kamala and copper sulphate for the treatment of *Hymenolepis* infestation in geese. Arecoline was found to be the most effective; it was given in doses of 0.002-0.0025 g. per kg. bodyweight after fasting. "Philitselene" and male fern extract also gave good results but they are very toxic, and have to be followed by a saline purgative. Diagnosis of infestation was made by examining the faeces for ova.

GAULIER, C. (1938). Contribution à l'étude des gènalcaloïdes en médecine vétérinaire. [**Genalkaloids in Veterinary Medicine**].—*Thesis, Alfort*. pp. 65. [Numerous refs.]

The author made observations on the use in canine medicine of three genalkaloids, genostrychnine, genomorphine, and genoscopaline—modifications of the alkaloids as defined by POLONOVSKI [many references, e.g. *C. R. Acad. Sci., Paris*. 181. 887.],—with a view to demonstrating that while they retain the therapeutic properties, the toxic effects of the alkaloids are much reduced. He describes experiments carried out.—R. ISHERWOOD.

STRASSL. (1938). Das Sterilitätsproblem und Abortosan E. [**The Treatment of Sterility with "Abortosan E"**].—*Berl. Münch. tierärztl. Wschr.* July 8th. 397-400. [8 refs.]

S. gives the results of his treatment of 75 sterile cows or heifers with "Abortosan E", a vitamin E (wheat germ oil) preparation. Favourable results are claimed for 68 cases and S. concludes that the preparation merits further trial. He discusses the conditions in which sterility arises.—V. CHLÁDEK (PRAGUE).

## POISONS AND POISONING

GINEITIENE, E. (1937). Apie gyvulių apsinuodijimus sarmais ir rūkštimis ir jų sukeltus patologinius pasikeitimus. [**Poisoning of Livestock by Caustic Alkalis and Acids**].—*Vet. ir Zootech., Kovno*. 14. 361-366. [4 refs.]

A general description of the lesions caused by acid and alkali poisoning, with no new material.—A. PABIJANSKAS (KAUNAS).

PEIRCE, A. W. (1938). **Observations on the Toxicity of Fluorine for Sheep**.—*Bull. Coun. sci. industr. Res. Aust.* No. 121. pp. 35. 3 text figs., 17 figs. on 6 plates, 6 tables. [Numerous refs.]

Phosphatic licks are widely used for sheep in Australia, bone-meal and dicalcic phosphate being chiefly employed. Although the giving of phosphatic licks to sheep is by no means a proved necessity, it appears that their use is likely to continue. It is desirable therefore to employ a cheaper and more abundant source of phosphorus than either bone-meal or dicalcic phosphate. This has led to the use of ground rock phosphates from Nauru Island or Ocean Island. The principal objection to these materials lies in their fluorine content (2.7%).

Extensive experiments showed that sheep which received 120 mg. or less of F daily grew normally, ate the same amount of food, and remained in good health throughout the experimental period of three years. The food consumption of sheep receiving 160 mg. F as Nauru rock phosphate and 170 mg. F as Florida phosphate was 45% and 60% respectively of that of controls, and the corresponding percentages for their weights at the end of the experiment were 55 and 70.

Ingestion of F did not reduce wool growth. Doses of 60 and 120 mg. F had no effect on the physical appearance of the bones. Higher doses brought about replacement of normal colour by a white, chalky appearance, and the walls of the bones became thickened, and in extreme cases exostoses appeared on the long bones. The mandibles also showed exostoses and increase in diameter. Sheep receiving 60 mg. or more F showed changes in the teeth roughly proportional to the amount ingested. The enamel of the incisors and molars was pitted and the latter teeth displayed abrasions, which may, in some cases, have been an important factor in lessened food consumption in sheep receiving 160 mg. and 170 mg. F daily. The changes in teeth and bones are illustrated in photographs. Ingestion of F had no definite effect on the ash content of bones, but the F content was increased ten times or more. F intake caused incisors to erupt at an earlier age. One adult sheep, fed 500 mg. F daily, developed exostoses of long bones and mandibles, but the teeth were not affected. Intermittent ingestion of F by one sheep resulted in increases in weight and food consumption during periods without F, indicating that intermittency of intake, as occurs in the consumption of licks under ordinary conditions of husbandry, may be a factor in reducing the toxicity of F for sheep.

It is considered that the lowest dose of F used, 60 mg. daily, probably exceeds the amount which a sheep is likely to consume in the form of a phosphatic lick (e.g. 60% rock phosphate and salt).—H. McL. GORDON.

- I. CALVERY, H. O., LAUG, E. P., & MORRIS, H. J. (1938). **The Chronic Effects on Dogs of Feeding Diets Containing Lead Acetate, Lead Arsenate, and Arsenic Trioxide in Varying Concentrations.**—*J. Pharmacol.* **64**. 364-387. 1 fig., 4 tables. [Numerous refs.]
- II. LAUG, E. P., & MORRIS, H. P. (1938). **The Effect of Lead on Rats Fed Diets Containing Lead Arsenate and Lead Acetate.**—*Ibid.* 388-410. 2 figs., 8 tables. [8 refs.]
- III. MORRIS, H. J., & WALLACE, E. W. (1938). **The Storage of Arsenic in Rats Fed a Diet Containing Calcium Arsenate and Arsenic Trioxide.**—*Ibid.* 411-419. 4 tables. [14 refs.]
- IV. MORRIS, H. P., LAUG, E. P., MORRIS, H. J., & GRANT, R. L. (1938). **The Growth and Reproduction of Rats Fed Diets Containing Lead Acetate and Arsenic Trioxide and the Lead and Arsenic Content of Newborn and Suckling Rats.**—*Ibid.* 420-445. 1 fig., 11 tables. [12 refs.]
- V. GRANT, R. L., CALVERY, H. O., LAUG, E. P., & MORRIS, H. J. (1938). **The Influence of Calcium and Phosphorus on the Storage and Toxicity of Lead and Arsenic.**—*Ibid.* 446-457. 2 figs., 5 tables. [18 refs.]
- VI. LIGHTBODY, H. D., & CALVERY, H. O. (1938). **Variations in the Arginase Concentrations in the Livers of White Rats caused by the Administration of Arsenic and Lead.**—*Ibid.* 458-464. 4 tables. [10 refs.]
- VII. CALVERY, H. O. (1938). **Chronic Effects of Ingested Lead and Arsenic. A Review and Correlation.**—*J. Amer. med. Ass.* **111**. 1722-1728. [Numerous refs.]

I. On an experiment to study the chronic effects of Pb and As separately and together, dogs of various ages were fed on a standard diet supplemented by various levels of added lead arsenate, lead acetate and arsenic trioxide. At the levels employed no animals died after receiving As and there was no difference in toxicity between Pb fed as the acetate and as the arsenate. Analysis of the soft tissues and various parts of the skeleton showed the greatest Pb retention was in the skeleton, with high levels also in kidney and liver. Under these conditions

the Pb storage in the femurs was 60% greater in the ends than in the shafts, and also greater in the cortex than in the medulla of the kidneys, whereas distribution throughout brain and liver was uniform. A newly-born pup from a dam receiving Pb showed a much higher Pb content than one from a control, showing evidence of maternal transmission, whilst the milk Pb was higher in Pb-fed dams. One dog receiving 2.56 mg. Pb per kg. bodyweight died within 15 days, whereas two others at a level of 0.33 mg. survived 140 and 167 days respectively. Survival differences were related to the age of the dogs, younger animals being the much more susceptible to Pb poisoning. Increasing the Ca content of the diet considerably reduced the susceptibility to Pb poisoning and its retention within the body. Considerable individual variation existed amongst the animals in respect of rate and severity of appearance of symptoms and in the amounts of Pb retained in different parts of the body.

II. Rats were put on to a diet adequate in all known food constituents and litter-mates on to the same diet supplemented by 3.53 mg. added Pb (as the arsenate) per kg. food. Male rats receiving Pb showed a lower growth rate than male controls, but female rats showed no significant differences. Storage of Pb was greater in the femurs, liver, kidneys, brain, hair and the whole body of Pb-fed animals than in controls. Ingestion of lead acetate over 6-7 weeks as 213 mg. Pb per kg. body weight caused marked increases in the weights of kidney and spleen, roughly paralleled by the Pb storage in these organs. Pb balance studies on ingested Pb were carried out and over 98% of the Pb was accounted for. The Pb content of the liver was surprisingly low, in disagreement with the general belief that the liver is an important Pb storage organ.

III. Rats were fed on the diet mentioned in II supplemented by 215 mg. As per kg. diet either as calcium arsenate or as arsenic trioxide. In the calcium arsenate series the live-weight gains were greater in As-fed rats than in controls, but there was no difference in the  $As_2O_3$  series. Large quantities of As were stored on these diets, the liver and kidneys storing by far the largest amounts per g. of dry weight. Statistical analysis showed that in the calcium arsenate series the livers were significantly greater and the brains smaller than in controls. The statement that pentavalent As (as calcium arsenate) has a greater tendency to be retained in the body than trivalent As (as  $As_2O_3$ ) receives a striking confirmation, the differences in As storage in some organs between calcium arsenate and  $As_2O_3$ -fed rats being greater than 200%.

IV. No significant difference in fertility and fecundity was noticed in rats fed a control diet compared with those on the same diet supplemented by 64 and 512 mg. Pb (as the acetate) per kg. food or by 26.8 and 215 mg. As (as  $As_2O_3$ ), nor were there any differences similarly between control and experimental groups in the  $F_1$  generation. The maternal transfer of both Pb and As to the foetus was demonstrated, the newly born on the lower Pb level containing 8 times and those on the higher level 40 times as much Pb as the newly born of control rats. At both levels of As feeding there was less As in the first litter of the first generation than in any of the later litters.

V. Rats were reared on basic diets, one high in Ca and low in P and the other low in Ca and high in P (differing however in fat and protein contents), to which were added known amounts of Pb as the arsenate. At the end of 93 days, surviving animals were analysed for Pb and As. The growth rate on the higher Pb and As levels was slower, especially on the low Ca diet, and the analyses showed that, in contrast to the generally accepted teaching, much more Pb was stored in the bodies of those rats on the low Ca diet than on the high, the reverse picture holding true for As. The experiments, as designed, were not able to give a decided answer to

the question as to whether low P or high fat increased the Pb storage in those animals on the high Ca low P diet.

VI. Rats to which daily subtoxic doses of Pb or As were given intraperitoneally showed a lower arginase content of the liver than that of untreated control animals. Those animals which ingested small quantities of Pb daily mixed with the food were found unable to respond to prolonged fast by increases in the liver arginase concentration as occurs in normal rats. By feeding small quantities of Pb and As to the mothers, suckling rats were found to have a lower liver arginase content than of those rats whose mothers had been fed on a control diet.

VII. A general review of the above.—ALFRED EDEN.

FORBES, J. C. (1939). **Studies on the Prevention of Liver Cirrhosis [From Acute Carbon Tetrachloride Poisoning] by the Subcutaneous Injections of Xanthine-Containing Preparations.**—*J. Pharmacol.* **65**. 287-293. 4 figs. [5 refs.]

Groups of rats, with adequate controls, were treated with subcutaneous injections of 50 and 100 mg. sodium xanthine per 100 g. body weight, with pure xanthine in strict suspension, and with crude liver preparations containing 50% xanthine, and exposed intermittently to  $\text{CCl}_4$  vapour over a period of 9-11 weeks. In all cases the development of liver cirrhosis was prevented or greatly retarded in the treated rats, affording evidence of the protective action of xanthine against  $\text{CCl}_4$  poisoning. Crude liver preparations freed from xanthine are apparently almost as effective in protection, and attempts have been made to isolate the substances responsible, but beyond qualitative tests little has been done to elucidate the possible nature of this substance.—ALFRED EDEN.

DOWGIATTO, J. (1938). **Zmiany w morfologicznym obrazie krwi koni przy zatruciu fosgenem oraz łączność ich z niektórymi objawami klinicznymi. [Changes in the Blood Picture and Clinical Picture of Horses Poisoned by Phosgene].**—*Wiad. weteryn.* **17**. 402-417. 7 figs., 2 tables. [Numerous refs.] [French summary].

Severe poisoning of horses with phosgene is followed by definite changes in the blood, valuable for early diagnosis during the latent stage; these blood changes correspond with the clinical signs. In the first phase (during the first hour after exposure) there is a decrease of the haemoglobin (71%), a slight decrease of the number of erythrocytes (6.1 millions) and also of leucocytes and lymphocytes; the blood cell sedimentation rate is accelerated and also the pulse and respiration rate, and the temperature is slightly increased. In the second stage (24 hours after exposure) there is an increase of the haemoglobin (up to 117%), the number of erythrocytes is raised (up to 13.8 millions per c.mm.) and of the leucocytes (up to 14,400 per c.mm.); the sedimentation rate attains 139 mm. in 24 hours, the respiration 60 and the pulse 80 per minute; the temperature is  $2.3^\circ \text{C}$ . above the normal. During the third stage in animals that recover (6 days after exposure) there is a gradual return to the normal, except that the temperature remains a little high. During the illness neutrophils are prevalent, whereas the number of eosinophils and lymphocytes is markedly lower.—V. CHLÁDEK.

BIESTER, H. E., & SCHWARTE, L. H. (1939). **Mouldy Corn Poisoning (Leucoencephalomalacia) in Horses with History of Previous Attack as well as Recovery from Virus Encephalomyelitis.**—*N. Amer. Vet.* **20**. No. 6. 17-19. 2 figs.

In the field the differential diagnosis of mouldy corn poisoning and virus

encephalomyelitis in horses is often difficult. Local conditions and the season of the year etc. are of some help, but for a correct diagnosis the brain must be submitted to a histological examination. In a case described, there was a history of previous attacks of both encephalomyelitis and mouldy corn poisoning. Typical changes of the latter disease only were present in the brain, and consisted of perivascular and diffuse oedema, haemorrhages and liquefaction necrosis; there was no cellular reaction typical of virus encephalomyelitis.—N. J. SCORGIE.

## PHYSIOLOGY

YOFFEY, J. M., & DRINKER, C. K. **The Lymphatic Pathway from the Nose and Pharynx. The Absorption of Dyes.**—*J. exp. Med.* **68**. 629-640. 5 figs., 2 tables. [10 refs.]

As a result of the statement that 'Type III pneumococci instilled into the nose of rabbits could often be found within an hour in the lymph nodes of the cervical region, these experiments on the cervical lymphatic pathway were undertaken in an attempt to discover the possible means by which the infection spreads from the naso-pharynx.

The experiments were performed on 1 monkey, 14 cats, 2 dogs, and 6 rabbits. A cannula was inserted into the cervical (tracheal) lymph duct after exposure in the lower third of the neck near its junction with the venous system. A solution of T-1824 or trypanblue, in physiological saline, was then instilled into the nose. In the cat, rabbit and monkey the dye appeared in the cannula from 15-30 minutes after instillation, in the dog after 1 hour. The concentration of the dye was weak at first, but it quickly increased to a constant level. In three cats hydrokollag (a fine suspension of graphite) was used but no evidence could be found of its entry into the lymph stream.

Although the dyes could be traced along the vessels of the nasopharynx to the superior cervical lymph node, by observation during the experiment and on subsequent dissection, no trace was ever found in the interior of the cranium, except in one case when a slight discoloration of the olfactory bulb was noticed. Results of this kind must depend to some extent on the nature of the solution used, as it is significant that workers who claim to have demonstrated passage *via* the nasopharynx used a solution of potassium ferrocyanide. The size of the animal must also be considered, as it is conceivable that the extra thickness of the cribriform plate in a large animal would be more resistant to the passage of dye.—C. W. O.

CONRAD, R. M., & SCOTT, H. M. (1938). **The Formation of the Egg of the Domestic Fowl.**—*Physiol. Rev.* **18**. 481-494. [Numerous refs.]

A useful review of recent work dealing with the formation of the fowl's egg. The following aspects are discussed:—the formation of the ovum and its yolk in the ovary, the mechanism of ovulation and its relation to light and to endocrine factors, the formation of the egg-white, and the formation and composition of the shell and shell membranes.—N. J. SCORGIE.

## MISCELLANEOUS

GRAHAM, R., & SAMPSON, J. (1938). **Animal Pathology and Hygiene.** pp. 133. Numerous figs. Springfield, Illinois: Department of Agriculture. [8vo].

A series of 60 lessons for agricultural students on animal physiology, hygiene and disease.—J. E.

HAMMOND, J. (1988). **Report on the Organization of Animal Research in New Zealand.**—*N.Z. J. Sci. Tech.* **19**. 762-788. 1 appendix.

[H. was invited to New Zealand by the Department of Scientific and Industrial Research to survey the requirements and facilities for research into problems of animal production and to prepare a report embodying suggestions for the organization of an Animal Research Bureau to control such research work in New Zealand.]

#### I.—SOME PROBLEMS OF ANIMAL RESEARCH IN NEW ZEALAND

The problems which appear to call for investigation are grouped under six headings:—

##### (i) *Survey Problems.*

A survey is required of the causes of wastage in the dairying sheep and pig industries.

##### (ii) *Genetical Problems.*

It is necessary to develop such practical applications of our genetical knowledge as the "progeny test" which is applied to dairy cattle. Suggestions are made for genetical observations on various species of stock.

##### (iii) *Fertility Problems.*

(a) *Sheep.*—Investigation of influence of management (feed and location) on fertility of ewes. Rams should be tested by semen examination before turning out with ewes.

(b) *Dairy cattle.*—Survey of conditions under which bull sterility occurs. Use of artificial insemination to increase progeny of "proven sires".

##### (iv) *Nutritional Problems.*

(a) Mineral deficiencies.

(b) Grazing and stocking problems.

(c) Critical times for controlling the plane of nutrition.

##### (v) *Meat Problems.*

Problems affecting production of required quality of meat are reviewed.

##### (vi) *Disease.*

The most important diseases of stock are outlined.

#### II.—REPORT ON THE ORGANIZATION OF AN ANIMAL RESEARCH BUREAU IN NEW ZEALAND

##### (i) *The Constitution of the Animal Research Bureau.*

Hammond recommends the formation of an Animal Research Bureau under the auspices of the Department of Scientific and Industrial Research. The personnel should include representatives of the Cawthron Institute, the Agricultural Colleges at Lincoln and Palmerston North, the Department of Agriculture and of farming and marketing organizations having an interest in animal production; the Bureau would be under the chairmanship of the Director-General of Agriculture. The Department of Scientific and Industrial Research should appoint two men of outstanding ability in the animal industry or related sciences. An executive committee of not more than five members should be elected by the Bureau to draw up plans of work for submission to the Bureau and to deal with urgent administrative matters arising between meetings. The secretary should be employed by the Department of Scientific and Industrial Research and be an *ex officio* member of the Bureau without a vote.

##### (ii) *Duties of the Animal Research Bureau.*

These are summarized under the following headings:—(a) to regulate the allocation of all funds for the purpose of animal research; (b) to survey the needs of the animal industry for research work from time to time and appoint specialist workers' committees (to report back to the Bureau) on any problems of importance

which they considered required solution ; (c) to co-ordinate the work going on in the different research institutes ; (d) to receive annually programmes of work for the following year from the Directors of research institutes ; (e) to receive a short annual report from each worker in the research Institutes ; (f) to inspect periodically the research institutes ; (g) to approve the grading and selection of staffs for the research institutes ; (h) to have the power to assist financially special investigations, other than those at research institutes, having relation to problems under consideration by the Bureau, and (i) to take active steps to encourage and support co-operation with similar work in other countries.

(iii) *Localization of Animal Research Institutes.*

It is suggested that research institutes to deal with problems of breeding, feeding and management of stock be formed at Massey and Lincoln Colleges, and one to investigate diseases of stock at Wallaceville.

(iv) *The Staffing of Animal Research Institutes.*

It is recognized that research workers should be as free as possible from all regulatory, administrative and teaching duties, and should have permanence of appointment. Suggestions are made regarding recruitment, training and remuneration of staff.

(v) *Organization of Animal Research Institutes.*

To each research institute a Director should be appointed, capable of leading a team of research workers drawn from various branches of sciences.

An attempt should be made to elucidate the scientific principles involved in a particular problem before an immediate remedy is sought. In this way results capable of wide general application may be expected.

(vi) *"Getting Over" Results to the Farmer.*

In order to achieve this the formation of an "Advisory Division" in the Department of Agriculture is recommended. Officers of this Division should have special knowledge of some particular phase of animal production or animal management and should be suited by their training for the district in which they are to function. They should have no regulatory duties to perform. Their duties would be to "Synthesize the results of research work into the best of practical management."

### III.—OBSERVATIONS ON ANIMAL RESEARCH WORK IN CONNEXION WITH THE FUTURE POSSIBILITIES IN THE MARKETING OF ANIMAL PRODUCE

The author discusses three subjects under this heading. The first is (1) whether the main pig exports are to be sent as pork or as bacon. He feels that it would be to New Zealand's advantage to concentrate on the production of pork in which she holds first place on the London market, rather than of bacon, for which the competition on the London market is much keener and in which field she ranks only about sixth in quality among countries exporting to England. The second is whether the marketing of butter as from tuberculosis-free cows is envisaged. The third question is considered particularly important ; it is whether any policy of preventing deterioration, *i.e.* erosion or loss of fertility of back-country sheep-breeding areas is contemplated. At present fat lambs produced on the low, flat lands tend to be rather too heavy and fat for the London market. Improvement of the back-country would increase the supply of lambs to the feeding areas, enable these lambs to get down earlier in the season and be got out at lighter weights.—L. W. N. FITCH.

YOUNG, D. (1938). **Pig Breeding and the Bacon Industry in Denmark.**—*Vet. J.* 94. 408-416. 5 figs. on 3 plates.

A general account of the industrial side of pig production in Denmark.—R. F.

## OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1939). **Twenty-Eighth Report of the Development Commissioners Being for the Year Ended the 31st March 1938.** pp. 184. London: H.M. Stat. Off. [8vo] [3s.]

Of the sum placed at the disposal of the Commissioners in 1937-1938, £46,427 was expended on veterinary research institutes and organizations by annually recurring or special grants, and £56,019 on animal genetics, animal nutrition, dairy research, helminthology, pig husbandry, poultry research and animal breeding. The veterinary institutes were:—the Institute of Animal Pathology, Cambridge; the Research Institute of the Royal Veterinary College, London; the Foot and Mouth Disease Research Committee, and the Animal Diseases Research Association of Scotland. Short accounts of the administration and finance of the research institutes are given. In addition to the sums mentioned above, grants are made for advisory work, including veterinary science, at various colleges and universities.

For research and administrative expenses at the Field Station established for the purpose of providing better facilities for the study of animal diseases and other subjects, the Agricultural Research Council received a grant of £60,000.

A grant of £6,000 was made for new buildings at the Royal (Dick) Veterinary College, Edinburgh.

The investigations in progress at the institutes supported by the grants of the Development Fund are described in reports issued by the Departments and reviewed in reports of the Agricultural Research Council.

One studentship for research in animal pathology and two studentships for poultry research were awarded.—J. C. WALLACE.

NEW ZEALAND. (1938). **Twelfth Annual Report of the Department of Scientific and Industrial Research, 1937-1938.** pp. 128. Numerous tables, 1 map. Wellington: Govt. Printer. [fcp.]

Continued work on cobalt conclusively demonstrated its value for the prevention and cure of bush sickness. Particulars are given of tests at various localities. Cobalt is being incorporated in superphosphate fertilizer for use on cobalt-deficient land.

It has been decided to set up an Animal Research Bureau subordinate to the Council, for the purpose of fostering research on animal industry, health and disease: the organization was still under discussion in 1938 [see special report on p. 808].

Research work was carried out in Canterbury Agricultural College on:—foetal development of lambs, ewe mortality (milk fever and sorrel poisoning in ewes) and lamb mortality (clover poisoning, pulpy kidney disease, and internal parasites). Details are not given.

At the Dominion Laboratory 9,416 milk samples were analyzed and some of them examined for effectiveness of pasteurization by the phosphatase test. Only a few were below standard.—L. W. N. FITCH.

ESTONIA. (1935). Loomatervishoiu osakond. [**Estonia: The Work of the State Veterinary Service, 1934-1935.**—*Valitsusasutiste tegevus 1934-1935.* pp. 81-82. 1 map.

During the year steps were taken for the effective control of BOVINE TUBERCULOSIS and BOVINE BRUCELLOSIS, four veterinary inspectors being engaged on this

work. 9,684 cases of SWINE ERYSIPELAS were diagnosed: serum treatment was employed to a large extent. The mortality from the disease was 6.7%. RABIES gave some trouble and to control it all the dogs in the country are registered and taxed and stray dogs killed. No cases of GLANDERS, F. & M. DISEASE or SWINE FEVER were notified during the year.

The country was divided into 95 veterinary divisions, of which 78 were manned by divisional veterinarians. These officers take part in the state control of diseases and also do private practice. In addition there were veterinarians appointed to 10 districts, 14 towns, 1 frontier posts and 4 abattoirs.

—ELFRIDE RIDALA (TARTU).

KOLBE, F. (1939). Bericht über die Tätigkeit des Kaiser-Wilhelm-Instituts für Lederforschung in Dresden und über wichtige in ihm ausgeführte Forschungen. [**Report of the Kaiser-Wilhelm Institute for Leather Research in Dresden**].—*Z. Fleisch- u. Milchhyg.* **49**. 121-123.

The institute's most important task is the prevention of damage to hides both before and after slaughter of the animal and for that it relies upon intensive dissemination of information on the subject.—G. WILLIAMSON.

POLAND. (1938). Sprawozdanie z działalności wydziału weterynaryjnego Państwowego Instytutu Naukowego Gospodarstwa Wiejskiego w Puławach za rok budżetowy 1937-38. [**Report on Work Done During 1937-1938 by the Veterinary Department of the Polish National Institute of Rural Economy, Pulawy**].—*Pam. pańs. Inst. nauk. Gosp. wiej. Puławy*. No. 2. pp. 4-13. 1 table. [French summary]. [Suppl. to *Wiad. weteryn.* **18**. No. 223].

This is just an index, partly statistical, of work done, together with notes concerning the staff.

## BOOK REVIEWS

CHALMERS, C. H. [B.Sc. (Edin.), N.D.A. Formerly of the University, Leeds]. (1939). **Bacteria in Relation to the Milk Supply. A Practical Guide for the Commercial Bacteriologist.** pp. xii + 209. 31 text figs., 8 figs. on 2 plates, 2 tables. [Numerous refs.] London: Edward Arnold & Co. [2nd Edit.] [8vo] [6s.]

Although this compact little book is intended primarily as a guide to the bacteriologist engaged in the wholesale milk trade it contains much which will interest public health workers and veterinary surgeons interested in the milk industry.

It is written in two parts. The first part gives a survey of the methods used in taking samples of milk and water, and the bacteriological examination of milk and water supplies and a guide to the examination of methods of production, processing and bottling milk. A useful chapter is included dealing with taints in milk due to bacterial contamination and foods and taints due to the action of various metals.

The second part of the book gives a very brief description of the microscope, its use and bacteriological technique.

It is essentially a work dealing with the production and distribution of "clean" milk rather than with the subject of disease-free milk.—H. E. BYWATER.

ROGER, H., & POURSIRES, Y. (1988). Les méningo-neurobrucelloses. [**Brucella Infection of the Nervous System**]. pp. 248. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 45].

This book is an extensive study of brucellosis as it affects the brain, meninges and nervous system of human beings, and is based on various published observations. The neurological complications due to both *Br. melitensis* and *Br. abortus* are becoming increasingly recognized and the descriptions given are held to apply to infection with any type of brucella. A few quoted experiments on small animals afford additional evidence of neurotropism.—S. J. GILBERT.

VIRTANEN, A. I. [Professor at the Technical University, Director of the Biochemical Institute, Helsinki]. (1988). **Cattle Fodder and Human Nutrition. With Special Reference to Biological Nitrogen Fixation.** pp. 108. 24 figs., 31 tables. [Numerous refs.] London: Cambridge University Press. [8vo] [7s. 6d.]

This book contains four very interesting and informative lectures which the author delivered in Great Britain in November, 1987, and, as the full title indicates, their scope is extensive. The central purpose, however, is to show how improved nutrition of the human population in Finland depends on improved winter nutrition of the dairy cow, how this, in turn, depends on the efficient production and conservation of leguminous crops, and how the national exploitation of these crops requires a thorough understanding of the symbiosis of legumes and nitrogen-fixing bacteria, and of the principles which underlie silage-making.

Lectures I and II are concerned with the chemistry and physiology of biological nitrogen-fixation and the symbiosis of legumes and intranodular bacteria.

In Lecture III, the author points out that the vitamin A deficiency of certain Finnish winter diets would be removed if the vitamin A content of winter milk could be raised to the summer level. He demonstrates how this object, as well as economies in feeding, can be achieved by adequate use of the A.I.V. legume silage in the rations of dairy cows.

In Lecture IV, he explains how the need for greater use of protein-rich legume crops and the well known difficulties of ensiling these crops led to a series of investigations which finally established the basic principle of silage-making, *viz.*, that the pH of the fodder mass must be reduced as quickly as possible to 4.0. The practical development of the A.I.V. method of silage-making is described, the main feature being the addition of mineral acids of 2N strength to the fodder as it is ensiled, coupled with careful consolidation to prevent the development of moulds.

Data are drawn from a comparative feeding trial and from the foods fed to dairy stock on two selected farms to illustrate the use and economy of A.I.V. legume silage in the feeding of dairy cows. On the two farms in question, the feeding of A.I.V. silage rendered the purchase of protein concentrates unnecessary, and the average yields of milk exceeded 700 gallons per lactation.

Experience in Great Britain does not entirely substantiate the high claims which the author makes for his process, and there is a tendency to prefer the molasses method. Nevertheless, the process has been very widely adopted in Finland, and providing adequate attention is paid to detail the A.I.V. process is the most certain method of producing silage of high nutritive value from protein-rich crops, and the most efficient of all ensilage processes in conserving the carotene content of the original crop.

Although the author emphasizes the value of A.I.V. silage from the stand-points of human nutrition and economy in cattle feeding, its outstanding significance for the health of farm animals will be especially noted by veterinarians.—W. R. M.

THE  
VETERINARY BULLETIN

Vol. 9.]

December, 1939.

[No. 12.]

DISEASES CAUSED BY BACTERIA AND FUNGI

UDALL, D. H. (1937). **Some Views Concerning the Significance of Mastitis.**—*Cornell Vet.* 27. 395-404. 1 table. [2 refs.]

The economic and public health significance of bovine mastitis are discussed. On the one side, in order to control the disease the milk producer is obliged to incur financial loss by withdrawing from his dairy herd cows which produce milk containing streptococci of a type commonly stated to be harmless to man. It is pointed out, however, that the streptococci which cause scarlet fever and septic sore throat in man may also be responsible for an inflammation of the bovine udder clinically identical with that caused by the *Streptococcus agalactiae* group; milk so infected may then cause epidemics. U. also remarks that the toxins in such milk from cows with mastitis have apparently been responsible for outbreaks of gastroenteritis in New York State, three of which involved 82-127 persons in each.—R. I.

LUYKEN, P. (1938). Haben hohe Kraftfuttergaben Einfluss auf die Zusammensetzung der Bakterienflora des Euters? [**Influence of Rich Diet on the Bacterial Flora of the Udder**].—*Inaug. Diss., Berlin.* pp. 24. [Num. refs.]

Seventeen cows whose normal udder flora had been ascertained were divided into three groups. Group I comprised six animals which were fed on a high protein diet, group II five animals receiving a less rich diet, while the six cows in group III were fed normally. The detailed rations and the protein-starch equivalents are given. The cows were examined repeatedly over a period of six months. Three of the six in group I showed mastitis streptococci, all five in group II were infected to a greater or lesser extent, while two of the six controls in group III became affected. L. concludes that no evidence of infection due to high feeding was obtained.—P. S. WATTS.

RÖNNEFAHRT, G. (1938). Beitrag zur Kenntnis des klinischen Euterbefundes bei trockenstehenden und frischmelken Kühen mit gesunden und keimhaltigen Eutern. [**Clinical Condition of the Udder in Non-Lactating and in Lactating Cows with Healthy and Infected Udders**].—*Inaug. Diss., Berlin.* pp. 41. [6 refs.]

Palpation of the udders of 8 dry cows, due to calve, and 40 newly-calved cows was correlated with (1) naked eye examination of the secretion of the dry cows or the colostrum of the milking cows, (2) microscopic examinations of the secretion or

colostrum for bacteria and cells, and (3) bacteriological examinations. The author gives full details for every cow and concludes that during this period of the puerperium the normal variations are so great that wherever any microscopic abnormality is present in the secretions a bacteriological examination should be made, and no reliance placed upon palpation, cell content, etc.—P. S. WATTS.

DANCE, D. A., & MURRAY, T. J. (1938). **A Study of Haemolytic Properties of Streptococci on Various Blood Agars.**—*J. infect. Dis.* **63**. 122-126. 1 table. [6 refs.]

Plain agar, fresh meat extract agar, veal-extract agar, and sugar-free meat-extract agar were used in combination with human, horse, bovine, sheep, or rabbit blood. With plain agar, bovine, sheep, and rabbit blood was lysed during incubation, and so could not be used. Surface plating was adopted and observations made at 24 and 48 hours. Forty-three strains of haemolytic streptococci were studied, chiefly from human, bovine and equine sources. With few exceptions either of the organisms tested reacts in approximately the same way on all the media used, *i.e.* an organism which was haemolytic on one type of blood-agar was haemolytic on the others.—JOHN FRANCIS.

TILLET, W. S. (1939). **The Fibrinolytic Activity of Haemolytic Streptococci.**—*Bact. Revs.* **2**. 161-216. [Numerous refs.]

The phenomenon of fibrinolysis warrants consideration from the biological standpoint and also as a factor in the pathogenesis of haemolytic streptococci. The influences of variations in technique is discussed in detail. The culture used for the study of this question should be taken at the time of maximum growth ; it is possible that accessory factors affect fibrinolysin production.

The incidence of fibrinolytic activity among human pathogenic strains is usually over 90 %. [For the correlation of fibrinolytic activity with serological and other characters see *V. B.* **9**. 61]. Groups A, B and G have been found to be fibrinolytic ; in groups C and G it is usually human strains that have this property. Non-haemolytic strains do not appear to produce fibrinolysin, and their anticoagulant effect is probably due to lactic acid. Cultures of *Pasteurella pestis* produced lysis of fibrin in blood clots from several species. In general, high fibrinolytic activity is associated with virulence and it is probably the cause of certain pathological changes. There is an apparent predilection of strains for the fibrin of species in which they may survive or become pathogenic.

Fibrinolysin is enzymic in nature, but differs from the other proteolytic enzymes in that it exerts no hydrolytic action on casein, gelatin or peptone, and it is thought that the chemical degradation it produces in the complex fibrin is slight, although the fibrin is probably altered immunologically.

The blood of 85-90 % of normal persons may be classified as susceptible to fibrinolysis on the basis of tests in which the dissolution time of the fibrin clot is less than an hour. In about 60 % of haemolytic streptococcal infections, resistance as judged by fibrinolysis tests develops during or after the disease. The titre of antistreptolysin and antihæmolyisin in the blood are not always present to the same degree.—JOHN FRANCIS.

BAUMANN, R. (1939). Gibt es eine durch Staphylokokken hervorgerufene Euteraktinomykose ? [**Actinomycosis of the Udder of a Goat due to Staphylococci**].—*Wien. tierärztl. Mschr.* **26**. 129-134. 2 figs. [Numerous refs.]

A case of actinomycosis of the right half of a goat's udder is described. The udder contained a great number of hard swellings, varying from the size of a pea

to that of a walnut. Some were encapsulated and contained cavities of a diameter of 0.5-2 cm., filled with greyish pus. Cultures made from the pus and the contents of the milk sinus contained *Staphylococcus aureus*. While the contents of the small nodules were found to contain typical staphylococci, the capsules contained clubs like those of true actinomycosis. The histological changes found in the udder and the larger nodules were similar to those found in true actinomycosis and were indistinguishable from them.—A. W. MÖLLER.

ROCHAIX, A., & RIVOLLIÉ, P. (1939). Recherches sur une dissociation du staphylocoque. [**Dissociation of Staphylococci**].—*Ann. Inst. Pasteur.* **62**. 577-594. 1 table. [Numerous refs.]

Previous descriptions of dissociation in staphylococci are discussed, and it is considered that a new type of dissociation has been discovered.

Six *aureus* strains isolated from pathological sources produced homogenous growths in peptone water. They were subcultured in broth T (Truche, Cramer and Cotoni)—[no details given]—and after a variable time grew in the form of clumps in a clear liquid. On plating out, two types of colonies were produced:—type A—small convex golden colonies; type B—larger smooth, flat, white colonies. These types were stabilized by subculture and, in peptone water, type A grew in the form of clumps and type B growth was homogenous. Under suitable conditions each type was maintained for two to three years. It is considered that *Staphylococcus aureus* and *S. albus* are dissociates of the same species.

The two types had similar staining and fermentative activity. Type A had greater proteolytic, haemolytic, antigenic and pathogenic powers. Marked difference in toxigenicity was not established. Morphologically, type A corresponds to the R form and type B to the S.—JOHN FRANCIS.

GREENER, Averil W. (1939). **Anthrax in Mink** (*Mustela vison*).—*J. Hyg., Camb.* **39**. 149-153. 1 table. [17 refs.]

Deaths from anthrax among mink bred for the fur are not infrequent since the animals are commonly fed on raw beef from knackeries. Details are given of six outbreaks in England in 1938 in which 320 mink out of a total of 1,290 were proved or presumed to have died of anthrax. In one small outbreak the onset of clinical anthrax in females with latent infection was occasioned by skin abrasions during mating.

Possible danger of human infection is discussed and it is concluded that the pickling of skins (with NaCl + HCl, as usually practised) is a sufficient safeguard to human beings using the skins.—F. C. MINETT.

MIRBABAÏ, K. (1938). Le rôle de la peau dans l'infection charbonneuse. Dangers des peaux des animaux charbonneux. Prévention. [**The Role of the Skin in Anthrax**].—*Thesis, Alfort*. pp. 77. 2 tables. [Numerous refs.]

A detailed survey of the literature on the subject is given. BESREDKA's work is reviewed and its application by NICOLAS in the intradermal vaccination of horses is discussed. Human infection through the handling of infected animal products, especially skins, in the course of commerce, is dealt with, as well as the ways in which animals can become infected. The means of prevention by disinfection and by sanitary measures are described. Cultural methods of discerning infection are considered to be the most certain, but in commerce they are not generally practicable, so the Ascoli precipitin test is the method advocated. The prevalence of anthrax in Iran, its importance and the difficulties of dealing with it are referred to.—G. WILLIAMSON.

I. DE MOULIN, F. (1937). Over de beteekenis der witte bloedcellen bij miltvuurinfecties. [**The Role of White Blood Corpuseles in Anthrax**].—*Ned.-ind. Bl. Diergeneesk.* **49**. 199-212. [4 refs.] [English and German summaries].

II. DE MOULIN, F. W. K. (1938). De beteekenis van het vegetatieve zenuwstelsel bij miltvuurinfecties. [**The Autonomic Nervous System in Anthrax**].—*Ibid.* **50**. 2-44. 8 figs., 10 graphs. [Numerous refs.] [English summary].

I. The author experimented with rabbits and sheep to ascertain the importance of leucocytes in anthrax infection. The animals were subcutaneously injected in the ear with anthrax bacilli and histological examination was made of the tissue at the point of injection after 4-24 hours. The experiments were done with dead and living virulent cultures, a non-pathogenic culture, attenuated vaccine strains and "carbozoo" vaccine. Leucocyte and lymphocyte emigration was more pronounced after injection with attenuated vaccine than in virulent infections. Dead virulent bacilli were phagocytosed very slightly indeed; living virulent bacilli and the attenuated bacilli were not phagocytosed at all. Only the non-pathogenic culture was taken up by the leucocytes. Encapsulated bacilli were never found phagocytosed. Leucocyte extracts prepared from artificial sterile abscesses provoked in immunized animals were shown to have bacteriolytic power. This bacteriolytic action was most pronounced on attenuated cultures; these extracts can be inactivated by heating for half an hour at 80°C. From the lymph nodes of immunized animals an extract was prepared which had the same action. The author suggests that these extracts contain a ferment which destroys the anthrax bacilli extracellularly. This seems to be the only possible way of destroying anthrax bacilli in the body.

II. A study was made of the autonomic nervous system and some of the endocrine glands of animals infected experimentally with anthrax, some having been vaccinated previously. In cases of rapid septicaemic death from anthrax the sympathetic nerve ganglia and adrenal and thyroid glands showed severe cytoplasmic lesions, characterized by vacuolization and lysis. Even in animals only vaccinated but not infected there were signs of beginning degeneration, whilst in animals which had survived a severe infection the changes were very advanced.

Anthrax causes serious disturbance of the blood corpuscle counts, and the author suggests that this blood disorder is due to a primary disturbance of haemopoiesis acting through the nervous and hormone systems.—JAC. JANSEN (UTRECHT).

HRUŠKA, K. (1938). Die Grundbedingungen zur Milzbrandbekämpfung. [**Fundamentals of Anthrax Control**].—*Prag. tierärztl. Arch.* **18**. 61-68.

It is very difficult to produce internal anthrax by introducing virulent bacteria and spores into the mouth, stomach or rectum, as no infection occurs unless there are lesions on the mucosa. For active immunization the glucoside vaccine is recommended for cattle, but not for other animals. A single inoculation affords sufficient immunity in 8-10 days. There may be reactions, but no deaths occur. An anti-aggressin and antibacterial serum were found successful for curative purposes in man and animals. For horses the simultaneous use of serum and vaccine, with subsequent application of the second Pasteur vaccine, is advised.

—V. CHLÁDEK (PRAGUE).

OBERENDER, K. (1937). Lumineszenz des Anthraxbazillus und der anthrakoiden Bakterien im Ultraviolettlicht. [**Luminescence of *B. anthracis* and *B. anthracoides* in Ultra-Violet Light**].—*Inaug. Diss., Munich.* pp. 32. 8 tables. [Numerous refs.]

An account of an attempt to distinguish *B. anthracis* from the anthracoid bacilli by the use of ultra-violet light. The possibility of its application was tested on cultures of the organisms on solid and in fluid media, and the work is described in detail. No distinguishing feature could be found either in colour or in luminescence under the great variety of conditions studied. A detailed resumé is given of the literature concerning this means of investigation.—G. WILLIAMSON.

- (1988). Maroc : Arrêté du directeur des affaires économiques prescrivant les mesures à prendre en vue de la prophylaxie de la tuberculose des bovidés. (Du 20 janvier 1988). [**Morocco : Decree of the 20th January 1988 on the Measures to be Taken for the Prophylaxis of Bovine TB.**].—*Bull. Off. internat. Epiz.* 17. 445-448.

All cattle on dairy farms which contain imported or cross-bred animals must be tuberculin tested (subcutaneously) by a veterinary surgeon, at least once a year, and the reports sent to the local veterinary authorities. Each animal is to be marked on the ear with a numbered disc, and both the owner and the veterinary surgeon are to keep a comprehensive register of the cattle on the farm; transference of cattle must be reported to the veterinary surgeon within 24 hours. These regulations do not, as yet, apply to farms containing only Moroccan cattle. All imported or cross-bred cattle must be tuberculin tested before entering a herd. The fees to be claimed by the veterinary surgeon for the tuberculin test, exclusive of the cost of the tuberculin, are fixed at ten francs for the first animal, five francs for each of the next four and three francs for each animal after five.

Positive reactors and cattle that are clinically affected with tuberculosis must be immediately isolated and branded and the byres disinfected; clinically-affected animals must be slaughtered at once, and positive reactors at a fixed date; the veterinary authorities must be notified of the slaughter. An indemnity is payable to the owner of 50% of the value for clinically-affected cattle and 80% for positive reactors not clinically affected.

HERMANSSON, K. A. (1938). Slakthusbesiktningens och organtvångets betydelse med hänsyn till påvisande av könstuberkulos hos röt kreatur. [**Meat Inspection for Genital TB. in Cattle.**].—*Skand. VetTidskr.* 28. 553-576. 10 tables. [English summary].

In the control of bovine TB. in Sweden, genital infections are regarded as very serious in spreading the disease. The existing regulations prescribe, therefore, that vaginal discharges from any cow whose new-born calf has tuberculous lesions on meat inspection shall in any case be submitted to a bacteriological examination, and that if TB. is detected, the animal shall be slaughtered immediately, government compensation being given. As detection of TB. in the new-born calf is the easiest method by which the mother cow can be traced, H. gives statistics to show the incidence of congenital TB. in calves in Sweden, and discusses the possibility of detecting such lesions by routine meat inspection.

Observations on 313 cases of congenital TB. in calves indicate that the most common sites of localization are the portal lymph nodes (99%), secondly the kidneys or the renal lymph nodes (14%) and, less commonly, those of the muscles (12%). The ineffectiveness in this respect of the inspection as it is carried out at the bureaux of the Swedish Meat Inspection Service compared with that at the municipal abattoirs is clearly demonstrated by statistics, covering two years, from six towns possessing both forms of inspection working concurrently. It is calculated that only 60% of the cases are detected at those bureaux where presentation of the organs is compulsory, and scarcely 40% at those bureaux without compulsory organ presentation.

From the point of view of the control of bovine TB., as well as of public health, the suggestion is made that it should be compulsory that when home-slaughtered carcasses of new-born calves (milk-fattened calves should be included) are presented for meat inspection they should have the liver and lungs, with the corresponding lymph nodes, still attached uninjured to the carcass.

—GUSTAV NAERLAND (OSLO).

STRUBE, G. (1938). Beitrag zur Frage der kongenitalen Tuberkulose des Kalbes. [**Congenital Tuberculosis in Calves**].—*Inaug. Diss., Berlin*. pp. 29. 2 tables. [Numerous refs.]

The work was undertaken to ascertain whether congenital TB. of the calf is always associated with infection of the maternal uterus. The method employed was to study the uterus in slaughtered cows, whether gravid or non-gravid, and the foetus, where present. In this way 201 non-gravid and 68 gravid uteri were dealt with as well as foetuses of all ages.

Of 192 non-gravid uteri, animal inoculation confirmed the macroscopic evidence of infection in six. A detailed description of the pathological and anatomical findings in each is given and the probable mode of infection is stated.

The gravid uteri are described under four groups:—(1) 34 where neither foetus nor dam were infected with TB.; (2) 16 where the dam had only pulmonary TB. and the foetus was free from infection; (3) 17 where several organs other than the uterus of the dam were affected but the foetus was free, and (4) 2 where both dam and foetus were affected.—G. WILLIAMSON.

KELLAND, J., FROOD, J. L., & DOYLE, T. M. (1938). **The Eradication of Tuberculosis from a Commercial Dairy Herd**.—*Vet. J.* **94**. 93-109. 3 tables. [7 refs.]

The authors record the steps taken to eradicate tuberculosis from a commercial dairy herd of approximately 250 pedigree Guernsey and Shorthorn cattle. It is pointed out that from 1917-1934 tuberculin tests were carried out on the herd every six months and reactors removed, but infection still persisted. The owner consulted the Ministry of Agriculture in 1934 and the following recommendations were made:—(a) the herd to be tested every 60 days with synthetic medium tuberculin, and after two negative tests the interval to be three months and later six months; (b) reactors to be removed and doubtful reactors retested, and (c) byres, yards, etc. to be thoroughly disinfected. From 1934-1936 47 reactors were removed but no reactors were found at tests in 1937. Details are given of the tuberculin tests used, with comments on the results obtained at two sites of inoculation, and results are given of autopsies and biological tests on reactor animals and animals showing anomalous reactions; most of the latter are attributed to so-called "skin TB." or to avian TB.—J. C. WALLACE.

REMMEL, E. (1938). Tapetud veiste trahheaal- ja bronhiaal-lima uurimisi *Mycobacterium tuberculosis* 'e ja teiste happekindlate bakterite suhtes. [**The Occurrence of *M. tuberculosis* and of other Acid-Fast Bacteria in the Tracheal and Bronchial Mucus of Slaughtered Cattle**].—*Eesti loomaarstl. Ring.* **14**. 5-9. [German summary].

The tracheal and bronchial mucus of 126 cattle, slaughtered in Tartu and showing no macroscopic tuberculous lesions in their lungs and regional lymph nodes, was examined microscopically and culturally, and in 72 cases inoculated intramuscularly into g. pigs.

Acid-fast bacteria were found in two cases; in one case there were tubercle

bacilli of the avian type, and in the other case there were acid-fast and alcohol-fast saphrophytes.—ELFRIDE RIDALA (TARTU).

HAIDER, A. (1987). Adatok a sertések bél-tuberculosisához. [**Intestinal Tuberculosis of Swine**].—*Thesis, Budapest*. pp. 10. [Numerous refs.] [German summary].

Macroscopic and histological examinations were made of the intestinal tracts of 200 tuberculous swine carcasses, in which the mesenteric lymph nodes were infected; intestinal TB. could be demonstrated in only one case, and then only in the form of a focus the size of a linseed in the muscular wall of the small intestine. Hyperplasia of Peyer's patches was found in 186 cases, but this proved to be non-specific, as similar changes were also found in non-tuberculous swine, and in addition histological and bacteriological examination failed to reveal tubercle bacilli.—G. SÁLYI (BUDAPEST).

McKAY, W. M. (1939). **Tuberculosis in the Goat**.—*Vet. Rec.* **51**. 782-788. [9 refs.]

The macroscopic lesions of pulmonary TB. in a 3½-year-old goat are described. During life the animal appeared to be perfectly healthy. A list of British references to caprine tuberculosis is given.—G. WILLIAMSON.

NEMES MIHÁLY, S. (1937). Adatok a baromfigümőkór elterjedtségéhez a népies tenyésztésben. [**Incidence of Fowl Tuberculosis in Small Holdings**].—*Thesis, Budapest*. pp. 14. 1 fig., 1 table. [German summary].

The intradermal tuberculin test was carried out on 4,934 hens from 208 farms in the same district. 958 hens (7·3%) coming from 33 farms (15·9%) were shown to be infected. Infection of the wattle, due to *Pasteurella aviseptica* infection, developed in some of the birds after the injection of the tuberculin. [The author discusses this point; it is impossible to draw any conclusions concerning the tuberculin reaction in the birds so affected].—G. SÁLYI (BUDAPEST).

MASTROFRANCISCO, N., & RAIMO, H. R. (1938). Estudo de um foco de tuberculose aviária em São Paulo. [**Avian Tuberculosis in São Paulo**].—*Rev. Industr. anim.* **1**. No. 4. 43-72. 18 figs., 2 plates, 1 table. [Numerous refs.] [English summary].

Autopsy was conducted on 133 birds at Agua Funda Asylum; 85 cases of TB. were found (77 ducks, 4 fowls, 3 turkeys, and 1 peacock). Avian tuberculin was prepared as for Koch's Old Tuberculin then diluted with equal parts of normal saline, the dose being 0·1 c.c., and the test being read at 24-48 hours. It gave an accuracy of 95% in the tests.

In 68·4% of the birds, multiple TB. lesions were observed in the intestines and associated organs—always in the liver. Pulmonary and tracheal lesions were found in only 18·7% of the birds. No pulmonary lesions were seen in the common domestic fowl, and in one species of Moroccan duck there were bone lesions in 16·6%.

Excellent coloured plates and photographs are given.—J. PASFIELD.

JEZIEFSKI, A. (1937). Badania nad wyosobnieniem i różnicowaniem pratków gruźlicy metodami hodowlanymi. [**Cultural Diagnosis of Tuberculosis**].—*Przegl. wet.* **52**. 688-656 and 768-795. 7 tables. [Numerous refs.] [German summary].

In tests with Petraghani's, Petroff's and Besredka's media, the latter with or

without malachite green, and with Löwenstein's medium, the last-named proved the most effective. Type differentiation was possible simply by observing the growth on the five different media, and by making subcultures on Löwenstein's medium.—V. CHLÁDEK (PRAGUE).

SUZUKI, C. (1988). Die Einteilung von Tuberkelbazillen mit Hilfe der Agglutination. [**Differentiation of Tubercle Bacilli by Means of the Agglutination Reaction**].—*Z. Immunforsch.* **93**. 498-501.

S. examined 101 strains of tubercle bacilli by agglutination methods. Of these, three were bovine and the remainder human strains. The three bovine strains fell into one serological group by themselves, whilst about 90 of the human strains also fell into a single group. The remaining human strains fell into two more groups.—E. J. PULLINGER.

ROSENTHAL, S. R. (1989). **The Multiple Puncture Method of BCG Vaccination.**—*Amer. Rev. Tuberc.* **39**. 128-134. 2 tables. [9 refs.]

With the object of overcoming drawbacks associated with the oral and subcutaneous administration of BCG, R. has tested the reaction of g. pigs and infants to multiple small doses. The vaccine was introduced by applying a suspension containing 5 mg. of BCG per c.c. to the shaved skin, and making from 80-85 skin punctures through the drop by means of a needle.

In the case of the infants, 138 were vaccinated by this method and 102 by the intracutaneous injection of approximately 0.038 mg. as a single dose; there were 237 uninoculated controls. The superiority of the multiple puncture method was shown by the absence of gross local lesions and of suppuration in the adjacent lymph nodes. Tuberculin tests applied after one year gave 100% positive results in the two vaccinated groups, and 2.2% in the controls.—R. E. GLOVER.

SAENZ, A., & CANETTI, G. (1988). Caractères différentiels des lésions pulmonaires produites chez le lapin par injection intratesticulaire de bacilles bovins ou humains morts, enrobés dans l'huile de vaseline. [**Differential Characters of the Lesions of the Lungs in Rabbits due to Intratesticular Injections of Dead Human and Bovine Tubercle Bacilli in Vaseline**].—*C. R. Soc. Biol. Paris*. **129**. 922-924. [4 refs.]

Heat-killed bovine tubercle bacilli in vaseline were injected intratesticularly into a group of sixteen rabbits, and a similar preparation of human bacilli was injected into another group of ten rabbits. The lesions produced in the lungs of the first group by the dead bovine bacilli were extensive and caseous, surrounded by a zone of haemorrhagic infiltration, and often proved fatal within 30-60 days of injection. In contrast, the lesions due to the dead human bacilli in the lungs of the second group, killed 50-110 days after injection, were smaller, more isolated, with very little necrosis and no haemorrhagic zone. The authors conclude that the difference in the severity of the lesions caused in the lungs of the rabbit by live bovine and human tubercle bacilli, a difference quantitatively comparable to that described for the two types of dead bacilli, must depend entirely on their chemical constitution.—R. O. MUIR.

ARLOING, P., THÉVENOT, L., & VIALIER, J. (1988). Dissociation directe des colonies R et S en partant des cultures homogènes en bouillon de souches humaines et bovines. [**Direct Dissociation of R and S Colonies of Homogeneous Broth Cultures of Human and Bovine Tubercle Bacilli**].—*C. R. Soc. Biol. Paris*. **129**. 584-587. [2 refs.]

Homogeneous broth cultures of two human and five bovine strains of tubercle

bacilli, which had been grown in liquid media for 25-41 years, were studied for rate of growth on various media, tendency to dissociate by serial subculture, reversibility of R and S characters, and the effect on cultural characters of intravenous passage in the rabbit (of culture from bone-marrow). All strains gave richest and most rapid growth on ordinary agar. The bovine strains dissociated less readily than the human strains into R and S types. Culture of the bone-marrow of rabbits, after intravenous passage, yielded a rich growth of R colonies, less characteristic and abundant in the bovine than in the human strains.—R. O. MUIR.

DAMBOVICEANU, A., & DORIN, E. (1937). Contribution à l'étude de la composition chimique des bacilles acido-résistants. [**Chemical Composition of Acid-Fast Bacilli**].—*Arch. roum. Path. exp. Microbiol.* 10. 401-451. 4 figs., 19 tables. [Numerous refs.]

The authors made a detailed study of the chemical composition of members of the acid-fast group. Particular attention was paid to the mineral composition of the organisms, and the effect on the chemical composition of the bacilli of adding mineral salts to the medium. It was found that relatively large amounts of different mineral salts (such as 20 g. % of  $MgSO_4$ ) in the medium had no inhibitory effect on the growth of the bacilli. The acid-fast bacilli have a certain stability in their mineral composition that is not easily altered. This is in contradistinction to such an organism as the cholera vibrio [work to be published by the authors].

Under the same conditions of culture there appears to be no great difference in the total amount of minerals in tubercle bacilli and Johne's bacilli, but the latter are generally richer in magnesium.

The findings and general conclusions of this work are not suitable for abstracting, and the article should be consulted in the original by those interested in the subject.—D. L. HUGHES.

JØRGENSEN, K. I. (1937). Mastitis fremkaldt af Blandingsinfektion med *Bacterium pyogenes* og anaërobe Mikrokokker. [**Mastitis Caused by Combined Infection with *Corynebacterium pyogenes* and Anaerobic Micrococci**].—*Maanedsskr. Dyrlaeg.* 49. 113-129. 1 fig. [16 refs.]

During a study of 14 cases of so-called *pyogenes* mastitis in which there was offensive pus formation, J. found a mixed infection of *Corynebact. pyogenes* and micrococci both of which developed in 5% blood agar plates. The former grew as numerous small haemolytic colonies and the latter as single large irregular opaque colonies below the surface of the agar, i.e. they were anaerobic.

In pure culture the micrococci were found to be gas producers and to form indol and  $H_2S$ , and they had the same smell as was found in the cases of mastitis from which they came. Clinically this type of mastitis is very severe, resulting in total destruction of the udder tissue and often in the death of the cow.

The micrococci were closely related to *Micrococcus indolicus*, but differed from it slightly with regard to  $H_2S$  production.—H. C. BENDIXEN.

ANON. (1939). An Organism Simulating Diphtheria Bacillus [*Corynebacterium ovis*].—*Lancet.* 236. 94-95.

A communication to the section of Pathology of the Royal Academy of Science in Ireland dealt with the isolation of *Corynebacterium ovis* from a human throat. It came from the throat of a healthy nurse suspected of being a diphtheria carrier. It was considered to be *Corynebact. ovis* on morphological, cultural and pathogenic grounds; it produced colonies on tellurite medium suggestive of the diphtheria

bacillus, but grew more profusely than the diphtheria bacillus on Loeffler's serum and agar and became almost coccal in form after sub-culture. Long bacillary forms appeared on serum cultures after 4-6 hours. The organism fermented glucose but not saccharose [*Corynebact. murium* ferments saccharose] and it liquefied gelatin slowly. It was pathogenic for the g. pig but did not produce the congestion of the adrenals which is characteristic when death is due to the diphtheria bacillus. It was also fatal for a g. pig which had been passively immunized with diphtheria antitoxin, and it was pathogenic for the rat.—R. LOVELL.

- I. TOMLIN, E. (1939). **Potassium Tellurite in the Diagnosis of Diphtheria.**—*Brit. med. J.* June 24th. 1273-1275. 3 tables. [4 refs.]
- II. TOMBLESON, J. B. L., & CAMPBELL, R. M. (1939). **The Immediate Tellurite Test in Diphtheria.**—*Ibid.* 1275-1277. 3 tables. [6 refs.]

I. A technique has been described in Buenos Aires for the bedside diagnosis of diphtheria by applying to the throat exudate by means of a swab a solution of 2% potassium tellurite in distilled water. Examination of the throat from five to ten minutes afterwards showed that in 37 of 40 cases of diphtheria definite darkening occurred, whereas in 35 cases which were not diphtheria, no darkening occurred. The author has used this technique in a number of cases, and his figures suggest that the test cannot be relied upon to give a correct diagnosis in cases of diphtheria because of the high number of false positives. In those cases in which a negative result is obtained however, one may be fairly safe in assuming that the case is not one of diphtheria. In his series there must have been a number of bacteria other than the diphtheria bacillus which give the darkening reaction.

II. The authors have used the technique described in I and although there was nearly a 70% agreement between the tellurite test and the bacteriological result, they also obtained many false positive reactions with the tellurite test. In view of the objections raised they also conclude that the test cannot be relied upon to confirm or exclude a clinical diagnosis of diphtheria, although a negative finding affords presumptive evidence against diphtheria.—R. LOVELL.

- JESPERSEN, K. W. (1938). Infektioner med Holth's Bacil paa Svineslagteriet i Odense. [**Infection of Swine with Holth's Bacillus at the Odense Abattoir**].—*Maanedsskr. Dyrlaeg.* 50. 65-76. 3 figs., 2 tables.

J. examined a large number of carcasses which had been detained at Odense abattoir on account of suspected tuberculosis, carrying out bacteriological culture tests with Löwenstein's and Petragnani's media. In many cases the supposed tuberculous lesions were associated with a bacillus first described by HOLTH and AMUNDSEN [*V. B.* 7. 54]. This organism was evidently responsible for about 8% of the condemnations of the pig carcasses on account of TB. It was only found in cervical lymph nodes; the lesions were small and macroscopically could be easily mistaken for those of TB.

J. is able to diagnose correctly by inspection about two-thirds of all lesions in the cervical lymph nodes of pigs either as TB. or as the so-called "Holth-infection". The other third requires to be differentiated microscopically or culturally.—H. C. BENDIXEN.

- SHANKS, P. L. (1939). **Acute Arthritis [in Pigs].**—*Vet. Rec.* 51. 783-784. [1 ref.]

A disease of pigs 10-14 weeks old, characterized by fever and acute arthritis, is described. Mortality may be 75% or higher. The chief pathological changes observed P.M. were in the joints. These were swollen, and on incision it was found that the normal synovia had been replaced by a yellowish-grey material

which was almost fibrinous in consistency. In some cases a fibrinous pleurisy, peritonitis and pericarditis were also present. In cultures from joints a slender, haemophilic, Gram-negative bacillus was isolated. A similar organism was also seen in smears from the fibrinous deposits in the joints and in the myocardium. This organism is stated to be identical with *Haemophilus influenzae suis* isolated from the lungs in piglet influenza. Treatment with soluseptasine or M & B 693 has been found to be highly successful.—N. J. SCORGIE.

MOINE, G. (1938). La pasteurellose bovine, complication de la fièvre aphteuse. [**Bovine Pasteurellosis, a Complication in Foot and Mouth Disease**].—*Rev. Path. comp.* 38. 1902-1905.

M. describes an outbreak of pasteurellosis in cattle affected with F. & M. disease. Diagnosis was made from symptoms and P.M. examination. Of 12 cattle affected, 5 died. Cattle which had received inoculation with convalescent (F. & M.) blood remained unaffected. Infection is attributed to polluted water supply and invasion through lesions in the digestive tube caused by F. & M. disease.—S. J. GILBERT.

KRANEVELD, F. C., & DJAENOEDIN, R. (1938). De waarde van longweefsel voor het stellen van de diagnose septicaemia haemorrhagica. [**The Value of Lung Tissue for the Diagnosis of Haemorrhagic Septicaemia**].—*Ned.-ind. Bl. Diergeneesk.* 50. 847-855. 2 tables. [English and German summaries].

For diagnosis of H.S. in buffaloes and cattle in the Dutch East Indies, lung tissue is often sent preserved in glycerol or equal parts of glycerol and water. By rabbit inoculation tests it was proved that pasteurella organisms could be more often demonstrated in rather large pieces of lung ( $2 \times 2 \times 3$  or 4 cm.) than in small pieces. A mixture of glycerol and water seemed preferable to pure glycerol. Better results are obtained when blood or oedema fluid is sent instead of lung tissue. Experiments were made to discover whether pasteurella occurs in the throat and lungs of normal buffaloes and cattle, but the result was negative in a hundred animals that were examined.—JAC. JANSEN (UTRECHT).

- I. MANNINGER, R. (1939). Die Bekämpfung des Paratyphus (Salmonellose) bei den Tieren. [**Control of Salmonella Infection in Animals**].—*Rep. 13th int. vet. Congr. 1938.* 1. 501-506. [In German : English, French and Italian summaries. Discussion pp. 537-540 in English and German].
- II. MIESSNER, H. (1939). Die Bekämpfung der Salmonellen (Enteritisinfektionen) bei den Tieren. [**Control of Salmonella Infection in Animals**].—*Ibid.* 519-531. [Numerous refs.] [In German : English, French and Italian summaries. Discussion pp. 537-540 in English and German].

I. The main plea in this paper was that the method of control of salmonella infection in animals should consist of the elimination of the animals which are infected with the bacilli. This cannot be achieved easily, for there are not only animals which are clinically affected with the organisms but also other apparently healthy animals which excrete them. Bacteriological diagnostic methods may not always detect these, although in the case of birds serological methods are recommended for the detection of those which are carriers of salmonella. In animals such as bovines the effort must be made to eliminate at least those which are visibly affected or recovering, because these are responsible for the heavy contamination of contact animals. Up to the present, control by means of immunization has not proved to be of value.

II. The author discussed salmonella infections in a variety of animal species,

but in all of them the methods of control included the use of a vaccine made by treatment of a culture with formalin. This control should be assisted by the slaughter of carriers and by hygienic measures in the case of bovines; in ducks the infection is transmitted by the egg and is of danger to man, and the public in Germany are advised to cook ducks' eggs at least 8 minutes; in silver fox management all food of animal origin should be cooked; in cases of abortion of mares and sheep there should be destruction of the products of abortion and the isolation of infected animals.

The discussion (common to both papers) dealt with points in the nomenclature of salmonella and a plea was made for the general adoption of the uniform nomenclature proposed by the Salmonella sub-committee of the International Society for Microbiology; KAUFFMANN of the State Serum Institute at Copenhagen would in the future be able to act as an arbiter with regard to doubtful and new strains of Salmonella. Although the use of vaccines as a measure of control was admitted as of some use by certain speakers, the consensus of opinion appeared to be that, at the present time the most effective and most suitable method of control was by the elimination of blood test reactors, and that more research was necessary before great reliance could be placed on vaccination. It was pointed out that the relative importance of the different antigens of all salmonella from an immunological aspect was only imperfectly understood, but that there was some hope that the chemical extracts now being studied by many would yield results which could eventually be applied in the field.—R. LOVELL.

SAXER, E. (1938). Untersuchungen über die Abortussalmonellose der Pferde in der Ajoie. [**Paratyphoid Abortion of Mares in the Ajoie**].—*Schweiz. Arch. Tierheilk.* **80**. 137-155 and 198-211. 5 figs., 5 charts, 1 map. [Num. refs.]

In the years 1932-33 there was an epizootic of *Salmonella abortus-equi* infection among the horses in the Ajoie district of Switzerland, animals of all ages and both sexes being attacked. The symptoms were fever, weakness and anaemia, with in some cases complications such as tendo-vaginitis, with of course abortion in the mares. Altogether at least 150 mares (20% of the pregnant mares of the district) aborted. 53 out of 69 samples of material from foetuses, foetal membranes, etc. contained almost pure cultures of *S. abortus-equi*. 92 out of 158 samples of blood (57.8%) agglutinated *S. abortus-equi* in a dilution of 1:100. The cultures obtained from the mares and from uterine exudate were uniform in their serological properties; those obtained from the foetuses varied greatly in sugar utilization. Cultures obtained from anaemic animals haemolysed horse-blood agar in 24 hours. This strain of *S. abortus-equi* was pathogenic for mice.

From control experiments it was proved that animals with a blood titre of 1:100 and higher can be regarded as infected or as carriers. No treatment was attempted, and the only means of controlling the disease is by hygienic measures together with serological tests and the removal of affected animals.—A. W. MÖLLER.

I. SHANKS, P. L. (1939). **A Record of Twelve Outbreaks of Paratyphoid Disease in Pigs in Northern Ireland.**—*Vet. J.* **95**. 180-185.

II. SAUNIER. (1939). A propos de la salmonellose du porc. [**Swine Salmonellosis**].—*Bull. Acad. vét. Fr.* **12**. 155-158. [4 refs.]

I. During the year ending February 1938 outbreaks of paratyphoid occurred in Northern Ireland, and a description is given of twelve such outbreaks. Very little pathological detail is given, and no bacteriology, except the statements regarding the sites from which the organism has been isolated and the fact that the organism is *Salmonella cholerae-suis* var. *kunzendorf*. S. is of the opinion

that predisposing conditions are necessary, and it is noted that in some cases the owner has bought in pigs or changed the rations, or there is overcrowding or some other unsatisfactory circumstance. Only a few pigs appear to be affected and many recover. In many cases there is a sign of pneumonic conditions, which may or may not be directly concerned with the aetiology of the disease. On one establishment where there were 6,000 pigs the incidence was reduced by providing the pigs—especially the piglets—with warm, comfortable and draught-free quarters with free access to the open yards. The efficacy of a dead vaccine used was doubtful, but treatment with M & B 693 gave encouragement sufficient to try larger scale experiments. The ages of the pigs affected on this farm were variable, up to 24 weeks.

II. An account of an infection in piglets from which *Salmonella cholerae-suis* was isolated is given. The morbidity is given as 20% and the mortality 95%. Predisposing conditions are cited here also and instances given of a diet too rich in proteins, weaning and sudden changes in the weather. The use of a vaccine prepared by formalinizing a culture is considered to have given good results. The piglets were given the first injection at the age of 10 days and the second 15 days later. When the infection showed itself earlier, then the first dose was given at birth. The author also tried a serum prepared in horses against other species of salmonella, and claims by this means to have prevented the spread of the disease to other piglets of the same litter.—R. LOVELL.

BUZNA, D. (1936). Ujabb vizsgálatok a *Bacillus suispestifer* kimutatásáról. [*Salmonella cholerae-suis* Infection in Pigs].—*Allatorv. Lapok*. **59**. 381-383. 3 tables.

B. examined the faeces of 2,782 healthy swine brought to Budapest from different regions of Hungary by rail. Using an enrichment method [*V. B.* **6**. 493.] which he states is most reliable he demonstrated *S. cholerae-suis* in 296 cases (10.5%) of the animals; the incidence in the pigs of English breeds was 13.9%, while that in Mangalica pigs was only 8.5%. He considers that the high percentage of infection was due to the fact that fatigue after rail transport and also, very probably, other conditions likely to lower vitality, such as pregnancy or parturition, favoured the multiplication of the bacteria in the intestine. The percentage of infected animals appeared subject to a seasonal variation, being somewhat higher in autumn and early winter than in February, March and April.

—G. SÁLYI (BUDAPEST).

- I. CASPERSEN, J. (1937). Paratyfusepidemi med eiendommeligg smittekilde. [*A Paratyphoid Outbreak with a Peculiar Origin (Dog)*].—*Forth. Norsk. Med. Selsk.* **1937**. pp. 138-143. Suppl. to *Norsk Mag. Laegevidensk.* **10**.
- II. ANON. (1938). Dogs as Paratyphoid Carriers.—*Lancet*. **234**. 214.
- III. MAGNUSSON, K. E. (1938). Ein Hund als Ansteckungsquelle von Paratyphusinfektionen. [*A Dog as Source of Paratyphoid Infection*].—*Z. Hyg. InfektKr.* **121**. 136-138. [1 ref.]
- IV. GARD, S. (1938). Ein neuer Salmonella-Typ (*S. abortus canis*). [*A New Type of Salmonella (S. abortus canis)*].—*Ibid.* 139-141. 2 tables.
- V. GARD, S. (1938). Berichtigung zu dem Artikel "Ein neuer Salmonella Typ (*S. abortus canis*)."  
[*Corrigendum to the Article "A New Salmonella, S. abortus-canis"*].—*Ibid.* 482.
- VI. KAUFFMANN, F., & HENNINGSSEN, E. J. (1939). A New Type of Salmonella from Man and Dog.—*Acta path. microbiol. scand.* **16**. 99-102. 2 tables. [In English].

I. Six persons living in three adjacent houses in Rakkestad, Norway, became ill with paratyphoid fever in March 1937. The isolated organism had the antigenic structure of a typical *S. paratyphi-B*. Milk was ruled out as a source of infection on account of the small number of persons involved, but a young dog was incriminated. It had been ill with paratyphoid-like symptoms for 14 days in February, and recovered just before the first human case occurred. Detailed bacteriological examination failed to isolate the organism from the dog, but its serum agglutinated suspensions of *S. paratyphi-B* to a dilution of 1:320 ("H") and 1:40 ("O"). The isolated strain was also agglutinated, on one occasion to 1:1,280 ("H"); 13 days later the "H" suspension was agglutinated at 1:640 and the "O" suspension at 1:920. The sera of 23 other dogs were examined for agglutinins against paratyphoid antigens and none were observed. The source of the dog's infection was not found.

II. An annotation which refers to the report in I points out that previously paratyphoid fever had never been recognized in a dog. Reference is made to the Croydon typhoid inquiry when evidence was given to the effect that the typhoid bacillus may be found in human but not in animal excreta. The implications of the report from Norway are, however, limited by the differences in biological properties between *Salmonella typhi* and *S. paratyphi-B*.

III. A small epidemic of human paratyphoid occurred in February and March 1938 in a small woodland village in Sweden. Milk and water were ruled out as vehicles of infection and the horses, cows and goats of the area appeared healthy. A week before the outbreak occurred a stray dog arrived and apparently took up its abode in the house where the first human case appeared. Immediately after its arrival the dog became ill and gave birth to four dead puppies; later it had diarrhoea, and paratyphoid bacilli were isolated from its faeces. The serum of the dog agglutinated a suspension of the organism at a titre of 1:250, and the source of the infection is considered to be the dog.

IV. The bacteriology of the epidemic described in III was carried out by G., who isolated the organism from the faeces of the dog and from three of the four patients. The sera of the human beings and of the dog had agglutinins against this organism. The isolated bacillus is called *S. abortus canis* and it is noted that it is pathogenic for the dog and for man. The biochemical reactions are given and its antigenic formula is as follows:—IV, V, XII: bz<sub>7</sub>z<sub>8</sub>. It therefore belongs to Group B of the Kauffmann-White scheme, its O antigen being similar to *S. paratyphi-B* and its H antigen shows the IB phase variation, the I phase being also similar to the H antigen (specific) of *S. paratyphi B*.

V. This correction does not concern *S. abortus canis* and merely refers to the antigenic structure of *S. odense* which was incorrectly given.

VI. A description is given of an outbreak of gastro-enteritis involving six of a family of seven. At the same time, but probably not earlier, the dog of the family had been vomiting and looking unwell. The other domestic animals of the family, a cat and some hens, were not ill.

From the faeces of the seven persons (including one who was not ill) and from the blood of the dog an organism of the salmonella group was isolated. It is named *Salmonella glostrup* after the place where the patients live. The origin of the infection was not detected and it was assumed that the source of the infection of the dog and patients was the same. The antigenic structure of the new salmonella is as follows:—VI, VIII: z<sub>10</sub>en. It belongs to Group C of the Kauffmann-White scheme, having a similar O antigen to *S. newport* and its H antigen shows the IB phase variation, the I phase being a new factor and the B phase being similar to but not identical with the H antigen of *S. abortus-equi*.

[These studies show that the dog must now be taken into consideration in an epidemic of human beings due to certain members of the salmonella group, for as is shown, the dog may in some cases be the apparent origin of an infection, whilst in others it may be infected at the same time and presumably from the same source as the human patients].—R. LOVELL.

STENERT, H. (1938). Ein Beitrag zur Epidemiologie des Bact. ent. Breslau. [**On the Epidemiology of *Salmonella typhi-murium***].—*Tierärztl. Rdsch.* **44**. 656-658. 1 fig. [4 refs.]

An attack of enteritis in a bull found to be due to *S. typhi-murium* was traced to its origin in ducks and geese; the blood of three out of the 85 geese, of one out of the 26 ducks, and of two horses, and eight calves that shared the pasture contained agglutinins for the organism. It was recovered from mixed samples of faeces of the geese and ducks, and from those of the eight calves on the same pasture. The owner had often lost birds, and on at least one occasion *S. typhi-murium* had been recovered from the carcass. One of the calves was found to be a constant carrier of the organism, but none of them had specific agglutinins in the blood. [In view of the evidence given by S., it seems that the calves were just as likely to have been the source of infection as the waterfowl].—A. W. MÖLLER.

CASTELO, M., & SALSAMENDI, R. C. (1938). Salmonelosis epizootica en conejos. (Por *Salmonella Typhi-murium*). [**An Outbreak of *S. typhi-murium* Infection in Rabbits**].—*Bol. Direcc. agric. Ganad. Montevideo.* **22**. 10-21. 5 figs.

The authors report an epizootic of *S. typhi-murium* infection in a rabbitry of 800 rabbits, of which 749 died between December and March. The animals were kept under good hygienic conditions, but were overcrowded. The period of illness was only a few days, and the symptoms were anorexia, laboured respiration and general lassitude. Healthy rabbits died within 12 days after being introduced into the rabbitry. Preventive measures adopted are given. Vaccination with formolized bacterial suspension of *S. typhi-murium* or with formolized natural aggressin proved useless. Tests for anaerobes or a filtrable virus proved negative. Agglutination tests revealed the following antigens, according to the Kauffmann-White scheme:—IV, V:i:1, 2. Agglutination tests were carried out on two vaccinated rabbits and their sera reacted to flagellar agglutinins at titres of 1:160 and 1:1,280 respectively; one out of six unvaccinated rabbits reacted at a titre of 1:2,560.

EDWARDS, P. R., & BRUNER, D. W. (1939). **Further Studies on Biochemical and Serological Varieties of *Salmonella typhi-murium***.—*Amer. J. Hyg. Sect. B.* **29**. 24-31. 2 tables. [Numerous refs.]

The authors studied 203 cultures of *S. typhi-murium*, isolated from domestic and laboratory animals. They found that biochemical tests could be used to distinguish strains epidemiologically related. Cultures from an outbreak were all identical with regard to the Bitter tests and the presence or absence of the antigen I of the Kauffmann-White classification. Of the 53 cultures isolated from pigeons, all of which were IV variants, only eleven resembled the "ammonia-weak" type of Hohn and Herrmann. Of the 59 cultures lacking antigen V, 53 were isolated from pigeons, and three were isolated from rabbits in contact with infected pigeons.

—A. A. B. ELLIS.

JANSEN, J. (1937). Cultuurtypen van *S. typhi-murium*. [**Cultural Types of *S. typhi-murium***].—*Tijdschr. Diergeneesk.* **64**. 624-629. 1 table. [15 refs.] [English, French and German summaries].

J. studied 46 strains of *S. typhi-murium* from domestic and wild animals. Using Simmons' medium and Hottinger's broth he obtained the following results :—22 fermented dextrose, arabinose, dulcitol and rhamnose, 17 fermented all of these except rhamnose; seven caused no change in  $\text{NaNH}_2\text{HPO}_4$ , in the ammonium phosphate medium of HOHN and HERRMANN [*V. B.* **8**. 498].—A. W. MÖLLER.

DIERCKING, K. (1937). Abänderung der Drigalski- Conradi- und der Gassner-Platte durch Saccharosezusatz. [**The Addition of Saccharose to Drigalski, Conradi and Gassner Culture Media**].—*Inaug. Diss., Hanover.* pp. 38. [15 refs.]

The addition of 3% saccharose to Drigalski-Conradi plates was found not to affect the differentiation between the *Salmonella enteritidis* group and the *Bact. coli* group (red colonies). When 54 strains of intermediate types difficult to distinguish on primary culture from the *enteritidis* group, and often occurring in normal carcasses in slaughter houses, were examined, 90% gave red colonies, thus showing their relationship with the *coli* group.—P. S. WATTS.

HEZEL, E. (1937). Die Bang-Infektion bei Mensch und Rind mit Berücksichtigung der Verhältnisse in Württemberg. [**Brucellosis in Man and Cattle in Württemberg**].—*Inaug. Diss., Munich.* pp. 22. 3 tables. [Numerous refs.]

Between 1929 and 1935, 56 cases of human infection were established clinically in Württemberg. The fact that 27 of these cases were agricultural workers and 6 were veterinary practitioners, is taken to indicate that direct contact with diseased animals is a more frequent source of infection than the consumption of raw milk or milk produce, to which only 10 cases could be traced.

*Br. abortus* cultures were killed when exposed to the direct action of human gastric juice for as short a time as five minutes. [No data are given for bovine brucellosis].

ZOTTNER, M. (1939). Les brucelloses animales. [**Animal Brucelloses**].—*9th Congr. Fed. Soc. Sci. méd. Afr. du Nord, 1939.* **1**. 98-100.

Current problems connected with brucellosis in the various domestic animals are reviewed with reference to epidemiology, symptomatology, latent infection, differentiation of brucella species, relative value of agglutination and allergic tests, and prophylactic measures. The absence of brucellosis established by more than 1,000 blood aggl. tests in indigenous cattle herds in zones of infection was, in the opinion of the author, due to their open-air mode of life. The merits of the various antigens used in the allergic test are compared, and emphasis is laid on the need for standardization. The allergic test is stated to be less reliable than the agglutination test. T. considers that a lanoline vaccine gives good results.—R. O. MUIR.

MACHADO, A. de M. (1938). Brucelose em Portugal. Ensaios sorológicos, culturais e biológicos. [**Brucellosis in Portugal**].—*Bol. pec., Lisboa.* **6**. No. 1. 15-40. 11 tables. [Numerous refs.] [French summary p. 276].

This article covers the period 1930-1936. Of 2,006 agglutination tests of bovine serum for brucella, 9.2% were positive, but the incidence is lower in some districts in Portugal; 15.5% of 618 tests on sheep and goats were positive, and 28.7% of 1,804 tests on swine.

The following conclusions are drawn :— the ratio between reactors and actual abortion is lower in swine than in cattle ; whey tests are often unreliable ; in 1933-1934, 4·9% of milk samples supplied to Lisbon were infected, and g. pigs inoculated with bovine material frequently exhibited no lesions, though their blood-serum reacted ; this was never the case after inoculations with porcine material.—J. PASFIELD.

ALESSANDRINI, A. (1938). La diffusione della brucellosi in Italia, con particolare riguardo alla Provincia di Arezzo. [**Incidence of Brucella Infection in Italy with Special Reference to Arezzo Province**].—*Ann. Igiene (sper.)*. **48**. 205-223. 1 graph, 1 chart, 1 map. [9 refs.]

A. reports that there is not a single region in the whole of Italy which is not affected with undulant fever. The greatest incidence occurs in Sicily, where about 80% of the population are said to be infected. *Br. melitensis* is the cause of disease in the south, while both *melitensis* and *abortus* infections occur in the central and northern parts of the country. The disease flares up during the months of April, May and June, as during that time large flocks of sheep and herds of cattle are removed to new pastures, thus spreading the disease into the new places which they traverse. More fresh cheese is consumed during spring, and it is in spring also that most abortions occur. Investigations were carried out in Arezzo, where the incidence of U.F. is very high, particularly in spring. Horses, dogs, deer and wild boar can become infected and spread the disease to man, as well as bovines, sheep, goats and pigs. Another fruitful source of infection is manure soiled with urine of infected goats, and such manure should not be used to fertilize vegetables.  
—A. J. CASSAR.

PARSCHAU, J. (1937). Untersuchung über Beziehungen zwischen den Abortus-fällen, den Milchleistungen und den verwandtschaftlichen Verhältnissen in Rinderherden. [**Relation between Abortions, Production of Milk, etc. in Cattle**].—*Inaug. Diss., Berlin*. pp. 15. 1 table, 1 chart. [9 refs.]

In 43 herds the histories of 5,404 cows were examined for records of abortion. The milk yields of 1,305 cows which had aborted were compared with those of the herd as a whole ; it was found that the yields of these cows were evenly distributed above and below the mean of the herd, and the conclusion drawn is that abortion has no influence on the milk yield of a cow.—P. S. WATTS.

KÄSTLI, P., & SAXER, E. (1938). Beobachtungen über den Verlauf der Rinder-abortus Banginfektion in einem frischverseuchten Milchviehbestand. [**The Course of Brucellosis in a Newly-Infected Dairy Herd**].—*Schweiz. Arch. Tierheilk.* **80**. 530-542. 1 table. [4 refs.]

A conventional article.—V. CHLÁDEK (PRAGUE).

MARBACH, H. (1938). Die Sterilitätsbekämpfung bei Kühen, die mit Abortus Bang infiziert sind. [**Control of Sterility in Brucella-Infected Cows**].—*Dtsch. tierärztl. Wschr.* **46**. 690-692.

M. states that sterility is often due to brucellosis. He speaks of the difficulty of eradicating the infection, but apparently without appreciating what can be done. He states that the results of sterility-treatment in positive reactors are successful in only 84% of cases, whereas in non-reactors 68% of cases can be treated successfully ; he suggests that sterile positive reactors should not be treated, but should be destroyed.—V. CHLÁDEK (PRAGUE).

HOPPE, R. (1938). O zmianach histologicznych w nerkach płodów przy brucellozie bydła. [**Histological Lesions of the Kidneys of Bovine Foetuses in Cows with Brucellosis**].—*Wiad. weteryn.* 17. 81-105. 5 figs. [Numerous refs.] [German summary].

Interstitial non-purulent nephritis detectable only on microscopic examination may be found in foetuses of brucella-infected cows. In the early stages there is an increase in the numbers and size of the capillary endothelial cells, and a diffuse infiltration of the interstitial spaces (especially in the cortex) by lymphocytes and histiocytes. Later, similar infiltrations appear in the interstitial spaces of the deeper tissues. As the disease progresses more centres of infiltration appear, and all increase in size. These changes correspond to those observed by LÜBKE [*V. B.* 5. 545.] in calves' kidneys and by BENDINGER [*V. B.* 6. 315.] in sheep's kidneys, described as "white spotted kidneys" ("nephritis maculosa alba") and evidently attributable to this disease. In the latter-mentioned condition, apart from the similar microscopic changes, there were also macroscopic centres of infiltration.—V. CHLÁDEK (PRAGUE).

HEINEN, A. (1938). Untersuchungen über das Vorkommen der Abortusinfektion bei Schlachtkälbern unter besonderer Berücksichtigung der sogenannten wiessen Fleckniere. [**Investigations on the Occurrence of *Brucella abortus* Infection in Slaughter Calves, with Special Reference to the So-Called White Spotted Kidneys**].—*Inaug. Diss., Berlin.* pp. 17. [Numerous refs.]

Material from nine calves with white spotted kidneys, was examined culturally and by animal inoculation. In no case was any evidence of *Br.a.* infection encountered.—P. S. WATTS.

- I. LISBONNE, M. (1939). Epidémiologie de la fièvre ondulante. [**Epidemiology of Undulant Fever**].—*9th Congr. Fed. Soc. Sci. méd. Afr. du Nord, 1939.* 1. 5-9. [6 refs.]
- II. BURNET, E., & BALOZET, L. (1939). Epidémiologie des brucelloses en Tunisie. [**Epidemiology of Brucellosis in Tunis**].—*Ibid.* 11-17. 2 figs., 1 table. [10 refs.]
- III. BURNET, E., & BALOZET, L. (1939). Prophylaxie des brucelloses en Tunisie. [**Prophylaxis of Brucellosis in Tunis**].—*Ibid.* 119-121. [1 ref.]
- IV. FORT, & ZOTTNER. (1939). Epidémiologie des brucelloses au Maroc. [**Epidemiology of Brucellosis in Morocco**].—*Ibid.* 19-25. 1 map.
- V. FORT, & ZOTTNER. (1939). Prophylaxie des brucelloses au Maroc. [**Prophylaxis of Brucellosis in Morocco**].—*Ibid.* 123-127. [1 ref.]
- VI. MERCIER. (1939). Epidémiologie de la fièvre de Malte en Algérie. [**Epidemiology of Malta Fever in Algeria**].—*Ibid.* 27-39. 3 charts, 2 maps.

I. An account is given of the distribution and spread of undulant fever in Southern and Central France since 1925, with an estimate of an annual incidence as 3,000-4,000 cases. The causative bacteria isolated by blood culture were classified as *Br. melitensis* (94%) and *Br. abortus* (6%). The authors did not encounter *Br. suis*. The goat and sheep are the chief reservoirs of *Br.m.* infection in Southern France, but *Br. melitensis* has been recovered from cows' milk and undulant fever patients in odd areas elsewhere in the country. An instance is stated of the isolation of two *Br.m.* and two *Br.a.* strains from four cows on the same farm in Belgium in the region of Namur. The paths of excretion in animals and of infection in man are described, and variation in incidence of infection is correlated with season, occupation, age and sex.

II. 8.3-9.7% of dairy goats, both native and Maltese, in Tunis and its

suburbs, were found to be infected with *Br.m.*, compared with a negligible incidence in rural districts. *Br.m.* was not detected in cows or sheep in districts where infection was prevalent in man and goats. Natural infection with *Br.m.* was found in two g. pigs and three house rats. *Br.a.* has not been found in goats or sheep. *Br.a.* infection in dairy cows was considered to be due to importation, since only 1.7% of native cows were infected, compared with about 50% in herds to which European cattle had been added. Undulant fever in man due to *Br.m.* and *Br.a.* was definitely associated with the consumption of dairy produce derived from infected goats and cows.

III. The authors suggest that *Br.m.* infection could be eliminated from Tunis by adding agglutination tests for goats, prohibition of the sale of the milk of positive reactors and obligatory slaughter of infected goats to the present prophylactic measures of compulsory notification of undulant fever, hygienic methods of milk production and prevention of the importation of Maltese goats. The introduction of suitable prophylaxis against *Br.a.* infection is recommended in the form of prohibition of the importation of positive reactors, encouragement of periodic agglutination tests in dairy herds and the slaughter of infected animals.

IV. Infection of both man and animals in Morocco by either *Br.m.* or *Br.a.* is regarded by the authors as infrequent. The distribution of *Br.m.* infection is limited to regions in the interior where goats and sheep are reared. *Br.a.* infection is mainly limited to the coastal zone where dairy cattle are bred and is not associated with disease in man. 800 sera from cows, sheep and goats, some collected at an abattoir and the remainder at random, were negative to the agglutination test for brucella infection. In the opinion of the authors, brucellosis is rare and this is due to strict importation regulations and energetic prophylaxis.

V. Prophylaxis against brucellosis in Morocco is described under the headings:—prevention of the importation of infected animals; slaughter of infected animals and control of animals in regions of known infection, and vaccination of healthy animals. Regulations are given governing the importation of goats and cows. Serological and allergic tests are suggested for determination of the extent of infection amongst animals in regions where undulant fever exists in man. An account follows of the satisfactory results obtained in 800 sheep and goats and in 1,000 cows by the use of lanoline vaccine.

VI. The endemicity and periodic epidemicity of Malta fever in Western Algeria is due to the fact that 80% of the milk produced in the endemic region is derived from the goat, which is recognized as the chief animal reservoir of *Br.m.* Examination of the milk of 1,500 goats in the district of Oran revealed that less than 4% were infected. Sheep were not incriminated as carriers but in one epidemic horses were recognized as the source of infection in several instances. Examples are given of infection of imported dairy cows by contact with goats. The ingestion of goats' milk and its derivatives, contact of goat-herds with infected animals, and indirect contact are regarded as the chief ways of human infection.

—R. O. MUIR.

- I. LISBONNE, M., & ROMAN, G. (1939). L'identification des brucella. [*Identification of Brucella*].—*9th Congr. Fed. Soc. Sci. méd. Afr. du Nord*, 1939. 1. 41-51.
- II. DUFFAU, E. (1939). Diagnostic bactériologique des brucelloses. [*Bacteriological Diagnosis of Brucellosis*].—*Ibid.* 53-63.
  - I. The authors describe in detail the criteria for the recognition of the genus *Brucella* and stress the importance of the use of a high titre brucella antiserum for final identification. The differential characters of the three *Brucella* species are

enumerated according to the methods of Huddleson and of de Sanctis, *viz.*, culture in the presence of 10% CO<sub>2</sub>, rate of H<sub>2</sub>S production and the bacteriostatic action of thionin, basic fuchsin and egg-albumin. The fixity of these properties is demonstrated after sub-culture in various media resulting in transition from S to R form and in alteration of agglutinability by heat, acid or trypanflavine. Of 1,149 brucella strains submitted to Huddleson's tests, only 8% could not be definitely classified. So-called *paramelitensis* and *para-abortus* strains, isolated mainly from blood samples with high agglutinating titres, were regarded as R variants, the frequency of which can be determined by Burnet's heat agglutination method. There follows a description of the methods of preparation of the media used in the specific differential tests.

II. The isolation of brucella species from internal organs, blood and other body fluids is described with details of selective media, sampling methods and optimum cultural conditions. Haemoculture proved positive in 72% of 1,190 cases of undulant fever. The intradermal test is discussed with reference to preparation of antigen, technique of inoculation and interpretation of reaction. The specificity of the test is demonstrated in a study of the intradermal reactions in 21 cases of undulant fever and in 60 cases of disease other than undulant fever. The complement-fixation and flocculation tests are briefly described. Nine of eighteen sera from cases of brucellosis gave negative complement-fixation tests. —R. O. MUIR.

WITZIGMANN, J. (1938). Hämatologische Untersuchungen beim Tetanus des Pferdes. [The Blood Picture in Tetanus in Horses].—*Tierärztl. Rdsch.* 44. 585-591. 10 tables. [10 refs.]

The blood of ten cases, six of which were fatal, was examined at various stages of the disease, mostly before treatment was given. In the animals that recovered, there was only a slight decrease of red and white corpuscles; in the fatal cases there was an increase of erythrocytes and a rise in the haemoglobin content in the final stage. Marked leucocytosis was a sign of impending secondary pneumonia in these cases. Specific antiserum did not alter the white cell count, but 3% phenol had this effect, causing it to return to normal.—V. CHÁDEK (PRAGUE).

GELZ, H. J. (1939). Ueber die Indikation der passiven, simultanen, und aktiven Schutzimpfung gegen Tetanus. [The Indications for Passive, Simultaneous, and Active Preventive Inoculation for Tetanus].—*Tierärztl. Rdsch.* 45. 424-427. [Numerous refs.]

G. discusses the preparation of tetanus antiserum, formol toxoid, and alum-precipitated formol-toxoid. He speaks of successful results in horses with a precipitated formol toxoid, apparently sold under a trade name: one treatment (two doses at an interval of 3-4 weeks) is said to have given immunity for a year and a further injection at the end of that time to increase the period for a further five years. Where injuries are extensive and healing delayed, the immunity following serum injection may not be sufficient, and a simultaneous injection of serum and of the toxoid is recommended, immunity being later reinforced by a further injection of toxoid alone.—H. E. HARBOUR.

PYLE, N. J., & BROWN, R. M. (1939). Botulism in Foxes.—*J. Amer. vet. med. Ass.* 94. 436-439. 3 tables. [2 refs.]

A description is given of the method employed to ascertain the cause of a fatal outbreak of disease on a fox-farm where the contents of blown cans of fish had formed part of the diet of the animals. *Clostridium botulinum* could not be

isolated, but the presence of its toxin [presumably type A] was demonstrated.  
—G. WILLIAMSON.

POZERSKI, E., & GUELIN, A. (1939). Etude des pouvoirs gélatinolytiques comparés de différents types et de différentes souches de *Bacillus perfringens*. [**Gelatinolytic Power of Different Types and Strains of *Clostridium welchii***].—*C. R. Soc. Biol. Paris*. 130. 514-516. [1 ref.]

Chamberland L3 filtrates of 24-hour glucose-broth cultures of 21 strains of *Cl. welchii* were added in quantities of 0.5 c.c. to amounts of 2 c.c. of sterile 2% gelatin, with the addition of five drops of toluol. These mixtures, after heating to 40°C. until liquid, were held for varying times at 37°C., before being cooled in ice so that liquefaction could be observed. The strains ranged from those whose filtrates caused complete liquefaction within 2-3 hours to those with little or no gelatinolytic power in 24 hours. A classification on these grounds was found to bear no relationship to the usual typing of the organism. The strains used included one type "A" and several of each of the other types.—H. E. HARBOUR.

- I. PUNTONI, V. (1937). Moderne concezioni sulla sistematica degli attinomiceti. [**Classification of the Actinomycetes**].—*Atti VI Congr. naz. Microbiol., Milan*. 1937. pp. 17-51. [Numerous refs.]
- II. REDAELLI, P. (1937). La biologia dei miceti parassiti dell'uomo ed il suo valore ai fini della sistematica. [**Biology of Mycetes Parasitic in Man**].—*Ibid.* pp. 53-90. [Numerous refs.]
- III. BALDACCI, E. (1937). Il concetto di specie negli attinomiceti ai fini della classificazione e della determinazione. [**The Species of Actinomycetes and Their Classification**].—*Ibid.* pp. 90-98. [Numerous refs.]

I. P. discussed the classification of actinomycosis organisms and suggested that they may be conveniently subdivided into the following three genera:—(1) *Actinomyces* Harz 1837, as emended by PUNTONI and LEONARDI 1935, for the aerobic forms with long filaments (hyphae), producing in culture a fructifying aerial mycelium (Puntoni's actinospores)—type species *A. albus* (Rossi-Doria); (2) *Asteroides* Puntoni and Leonardi 1935 for the aerobic forms with shorter filaments, not producing a fructifying aerial mycelium in culture—type species *A. asteroides* (Eppinger), and (3) *Actinobacterium* Haass 1906 (= *Cohnistreptothrix* Pinoy 1913) for the anaerobic forms with bacilliform elements—type species *A. israeli* (Kruse). These three genera (Latin diagnoses of which are appended) are stated to correspond respectively to the sections *Majores*, *Minores*, and *Breviores* of certain previous authors, e.g. BRUMPT [*V. B.* 7. 310.], LANGERON [(1922). *Nouveau Traité de Med.*, Paris: de Roger, Widal et Teissiet], and others. In his opinion, the existing confusion in the nomenclature of the species of Actinomycetes is mainly due to the fact that species were hitherto frequently created on medical (clinical and anatomic-pathological) rather than on botanical grounds; this has led to the inclusion of greatly different forms in one and the same species, while entirely identical forms have frequently been described under different names. Thus, for instance, strains of *A. sulphureus* Gasperini, *A. albus* (Rossi-Doria), *A. chromogenus* Gasperini, *A. albido flavus* (Rossi-Doria), and *A. carneus* (Rossi-Doria), isolated from bovine and human actinomycoses, have all been referred to *A. bovis*. For these reasons a thorough revision of all the existing species is strongly advocated.

P. considers further that the division of the Actinomycetes into two sections, *Parasitica* and *Saprophytica* is not acceptable, inasmuch as the sporadic nature of actinomycotic infections strongly suggests that these pathological conditions arise

from the accidental development in animal or human tissues of saprophytic organisms commonly and widely present in the environment. While this suggestion is stated to have been fully confirmed by ROSSI-DORIA (1891) and GASPERINI (1890) in respect of actinomycoses due to the aerobic forms belonging to the genera *Actinomyces* and *Asteroides*, the origin of the infections caused by the anaerobic forms is still obscure; P. says, however, that he has recently demonstrated that the well-known intestinal saprophyte *Bacterium bifidum* is identical in its morphological, cultural and biological characteristics with *Actinobacterium israeli* (Kruse).

II. R. states that the results up to date of work initiated in 1923 indicate that while certain biological properties *in vivo* and *in vitro* of mycetes pathogenic to man and animals are sufficiently constant and significant to be used in the classification and nomenclature of these organisms, alone they have no absolute value as grounds for classification, and must be considered in conjunction with, and in relation to, the morphological and other characteristics of the mycetes. He believes, however, that in some cases certain biological properties (e.g., micro-aerophilia) may be used to characterize systematic groups higher than the species, as is already practised in respect of the Schizomycetes. In his opinion a greater degree of uniformity and homogeneity in the nomenclature of taxonomic units below the species might be attained by the adoption for the mycetes of the trinomial system, as already accepted by zoologists and also by the American Code of Botanic Nomenclature.

III. B. illustrates by some concrete examples the extreme confusion now existing in the classification and nomenclature of the Actinomycetes, which he attributes chiefly to the diversity of the criteria used by previous authors in establishing their taxonomic units. He strongly advocates a thorough revision of all the species described hitherto, and suggests that the new classifications should be established on the following criteria:—(1) morphological characteristics, which in his opinion have an absolute value (with the exception of biometrical details, which should, however, be noted) for the establishment of the species; (2) cultural characteristics, with due consideration of factors such as pleomorphism *sensu lato*, ageing, pathogenic derivation, and the like, which may lead to the development of variants, and (3) biochemical properties, which should be studied in their complex by standardized methods. The value of the pathogenicity of the organisms as a criterion is still under discussion, and requires further investigation. The substrate from which the mycete is isolated is not considered to be of systematic significance.

B. does not accept the reference by PUTONI and LEONARDI of *Actinomyces asteroides* to the new genus *Asteroides* [see I, above]; he suggests for it the name *Proactinomyces asteroides* (Epp.) Bald. n. comb.

GRIGORAKI, L., & DAVID, R. (1938). Caractères biochimiques des champignons des teignes. [Biochemical Characteristics of the Ringworm Fungi].—*C. R. Soc. Biol. Paris*. 128. 889-891. [2 refs.]

The authors studied the biochemical characters of two non-pleomorphic species, *Trichophyton crateriforme* and *Achorion violaceum*, and describe variations:—(1) action on milk due to the presence of a casein-splitting enzyme at 20°C.—*T.c.*, digestion commencing in 4 days and complete in 19 days; *A.v.*, digestion commencing in 7 days and complete in 40 days; (2) liquefaction of gelatine, due to an endotryptase, on 7 mm. layers of medium in Erlenmeyer flasks at 18°C.—*T.c.*, 1 cm. diameter liquefaction in 6 days; *A.v.*, 1 cm. diameter liquefaction in 3 days; (3) hydrolysis of saccharose, due to an invertase, upon a 10% solution in yeast water at 25°C. after 21 days—(a) rotation of the solution, *T.c.*, 1.15 and

*A.v.*, 1·20, (b) reducing enzyme (g. per litre), *T.c.*, 2·05 and *A.v.*, 2·60 : (4) fermentation of 8% solution of glucose at 20°C. for 4 days and then at 35°C. for 4 days—*T.c.*, 11 small bubbles of CO<sub>2</sub>; *A.v.*, nil : (5) maximum growth temperature—*T.c.*, 45°C.; *A.v.*, 43°C. : (6) optimum temperature—*T.c.*, 35°C.; *A.v.*, 35°C.—C. V. WATKINS.

HART, L. (1937). **A Short Note on the Occurrence in New South Wales of Mycosis in Turkeys, Geese and Fowls due to *Aspergillus fumigatus*.**—*Vet. Res. Rep.*, *Dep. Agric. N.S.W.* 1937. pp. 76-77. [4 refs.]

H. records the loss of 50 turkeys in a flock of 800 due to infection with *A. fumigatus*. The same parasite was found in geese and in one domestic fowl. He stresses the low incidence of this disease in poultry in Australia as compared with European countries and America, and attributes it to the different climate and the system of management which provides a sunny environment not favourable to the growth of the fungus.—T. S. GREGORY.

## DISEASES CAUSED BY PROTOZOAN PARASITES

SALHOFF, S. (1938). "Schwarzkopfkrankheit" auch beim Birkwild. [**Blackhead in a Black Cock**].—*Berl. tierärztl. Wschr.* Jan. 28th. 49-50. [4 refs.]

Blackhead was diagnosed in a wild black cock. The findings at autopsy were typical; the caecum was very much swollen and distended, and there were flat or sharply circumscribed circular ulcers in the mucous membrane, which had led to perforation of the intestinal wall. The changes in the liver were not clearly marked.—SASSENHOFF (MUNICH).

LAFAYE, SAUNIE, & HOLSTEIN. (1938). Quatre cas de leishmaniose dans la région parisienne. [**Four Cases of Canine Leishmaniasis near Paris**].—*Rec. Méd. vét.* 114. 657-659.

A four-year-old Irish setter, which had lived on the Mediterranean coast, was affected with what appeared to be piroplasmiasis and sarcoptic mange. Examination of the blood revealed no piroplasms, but leishmania bodies were found in sections of sound skin taken from an area of old cicatrized ulcers. The formol-gel test was positive, the intensity of reaction progressively diminishing as the dog recovered; 35 injections of anthiomaline were given during 14 weeks. Three other cases were found and were destroyed.—M. L. BINGHAM.

CURASSON, G. (1939). Sur la classification et la détermination des trypanosomes pathogènes de l'A.O.F. [**Classification and Identification of the Pathogenic Trypanosomes of French West Africa**].—*Bull. Serv. zootech. Epiz. A.O.F.* 2. No. 2. 19-21.

The study of trypanosomes in Africa may be divided into three periods, in the first of which any slight morphological variation or even geographical distribution was sufficient for the creation of a new species. In the second period some doubt arose as to the validity of these species, but the majority of them were retained as the evidence was not sufficient to refute the early findings. In the third period the multiplicity of species was attacked, and although some variation was admitted it was ascribed to strains rather than species. Biologically this simplification was justified by the finding that strains might be modified in the process of fly transmission or by residence in a different mammalian host.

It is now claimed that the species existing in French West Africa can be

reduced to the two monomorphic species *Trypanosoma congolense* and *Tryp. vivax*, and the two polymorphic species *Tryp. brucei* and *Tryp. evansi*. *Tryp. congolense* can usually be distinguished from *Tryp. vivax* by its smaller size, but since small strains of *Tryp. vivax* exist, the fact that the kinetoplast in *Tryp. congolense* is marginal, and in *Tryp. vivax* terminal, is often an aid in reaching a decision. *Tryp. brucei* can be distinguished from *Tryp. evansi* by the fact that the forms without a free flagellum are much more numerous. [*Tryp. evansi* is usually regarded as a monomorphic species in which all the individuals possess a free flagellum].—U. F. RICHARDSON.

JAUFFRET, R. (1939). Contribution à l'étude du surra des bovidés au Cambodge.

[**Bovine Surra in Cambodia, Indochina**].—*Rec. Méd. vét. exot.* 12. 5-14.

Anti-rinderpest vaccination precipitated latent infection with *Trypanosoma evansi* in 24 out of 4,668 apparently healthy cattle for export. Appearance of the parasites in peripheral blood some days after vaccination was preceded by a rise in temperature. Subcutaneous injection of 2 g. of naganol in 20 c.c. of water effected an immediate fall in temperature and apparently cured the animals. In four cases the efficiency of the cure was subsequently verified by experimental inoculation of goats with blood from the previously treated animals.

An outbreak of surra in horses was shown to be of bovine origin, the parasite having probably been transmitted mechanically by biting flies. Naganol in doses of 1.5-2 g. in horses of about 150 kg. was effective if given early in the course of the disease. In practice two such doses were given at an interval of eight days.

—H. E. HARBOUR.

I. CULBERTSON, J. T. (1939). **The Immunization of Rats of Different Age Groups against *Trypanosoma lewisi* by the Administration of Specific Antiserum per os.**—*J. Parasit.* 25. 181-182. 1 table.

II. CULBERTSON, J. T. (1939). **Transmission of Resistance against *Trypanosoma lewisi* from a Passively Immunized Mother Rat to Young Nursing upon Her.**—*Ibid.* 182-183. 1 table.

I. Rats of 10, 15, 20, 40, and 60 days of age were given *per os* antiserum prepared against *Tryp. lewisi*, the dose being repeated on five successive days. C. found that rats could be immunized throughout the stage prior to weaning period (21 days), though with progressively less effect after weaning. [For previous work see *V. B.* 9. 12].

II. Young rats, nursed on a mother rat immunized with immune serum immediately after delivery, showed a considerable degree of protection against subsequent experimental infection with *Tryp. lewisi*, while the mother was still protected by the serum. A control group was nursed on a mother injected with normal serum only. At birth, three of the young of one mother were exchanged with three of those of the other mother.—M. L. BINGHAM.

ROUBAUD, E., & PROVOST, A. (1939). Sensibilité du lapin au trypanosome des ruminants des antilles, *Tr. viennei*, souche américaine de *Tr. cazalbouii* (*vivax*). [**Susceptibility of Rabbits to *Tryp. viennei*, the American Strain of *Tryp. vivax***].—*Bull. Soc. Path. exot.* 32. 553-559. 3 figs. [5 refs.]

The susceptibility of the rabbit to *Tryp. vivax* is discussed, and it is pointed out that though successful inoculation has been recorded, results have been rather irregular. Working with the American strain of this trypanosome, the authors succeeded in infecting rabbits when they used blood from a goat which had been recently infected, but failed when they used blood from an animal in the later

stages of infection. The trypanosomes were never numerous in the blood of the rabbits, and infections were usually very fleeting. Rabbits which appeared to have overcome the infection could be reinfected.—U. F. RICHARDSON.

ROUBAUD, E., & PROVOST, A. (1939). Arrêts de croissance au cours d'infections à *Trypanosoma gambiense* chez la souris. [**Growth Inhibition of Mice during *Tryp. gambiense* Infection**].—*Bull. Soc. Path. exot.* **32**. 387-390. 2 figs., 1 table.

A strain of *Tryp. gambiense* collected in the Cameroons gave very unusual reactions when inoculated into young mice in that the animals might live for several months with only rare appearances of trypanosomes in the blood. The infected mice failed to develop normally, and in one animal, which lived for over six months after infection, the weight was only 9 g. against a normal weight of 20 g.—U. F. RICHARDSON.

ACOSTA, J. I., & ROMANA, C. (1938). Infección del murciélago *Desmodus rotundus* (E. Geoffroy) por *Trypanosoma equinum* (Elmassiani) y transmisión del "Mal de caderas" por su mordedura. [**Infection of *Desmodus Bats* with *Trypanosoma equinum* and Transmission of the Disease by Bat Bites**].—*Mem. Inst. Osw. Cruz.* **33**. 291-295. [1 ref.]

The blood-lapping bat *Desmodus rotundus* becomes infected by feeding on horses with *Trypanosoma equinum* infection and may transmit the disease to horses and g. pigs by its bites. The survival of infected bats, which show no symptoms and may harbour trypanosomes for a long time (3 months), as shown by experimental inoculations with their blood, lead the authors to suspect that the bats may act as true "reservoirs" of the parasite. The disease transmitted by bats that had been experimentally infected, did not show any difference from the natural disease.—S. TORRES.

GEMETRO, L. (1937). El mal de caderas en la frontera norte argentina. [**Equine Mal de Caderas (*Trypanosoma equinum* Infection) at the Northern Frontier of Argentina**].—*Rev. Med. vet., B. Aires.* **19**. 369-395. 6 figs., 1 graph, 2 maps.

G. traces three stages of the condition:—(1) the nervous phase, characterized by hyperpyrexia, dyspnoea and debility; (2) the phase of incoordination, lasting 12-20 days, and (3) the chronic phase, with normal temperature, icterus and lethargy, lasting in some mules more than a year. Prophylactic treatment is given with "Bayer 205" in diminishing doses (2.50 g., 2 g., and 1.5 g.) at six-week intervals commencing in early March. This product has little value as a curative agent. Other measures adopted by the author were the substitution of Sudan grass and alfalfa for local fodder, drinking from running water, and the provision of remount ranches on high ground.—J. PASFIELD.

REŘÁBEK, J. (1936). K patogenesi experimentálních trypanosomias u drobných laboratorních zvířat. [**Pathogenesis of Experimental Trypanosomiasis in Small Laboratory Animals**].—*Biol. Spisy Vys. Šk. Zvěrolék. Brno.* **15**. 89-122. 5 figs. [Numerous refs.] [German summary].

The author reports on *T. equiperdum* and *T. brucei* infection in g. pigs. By g. pig passage the virulence of both strains decreased, but it was raised again by rat passage. After two years' passage in g. pigs the virulence had decreased so much that g. pigs infected with this passage strain contracted mild illness.

The author discusses the factors that determine the severity of the disease process when laboratory animals are infected with pathogenic trypanosomes.  
—E. PŘIBYL (BRNO).

HOARE, C. A. (1938). **Development of Mammalian Trypanosomes in the Body-Cavity of Caterpillars.**—*Trans. R. Soc. trop. Med. Hyg.* **32**. 8-9. [4 refs.]

Attempts to cultivate mammalian trypanosomes in caterpillars were unsuccessful, except in the case of *Trypanosoma cruzi*. In this case the trypanosomes which survived underwent the typical developmental stages as seen in their normal intermediate hosts and in artificial cultures.—M. L. BINGHAM.

I. PALLASKE, G., & VOLKMANN, A. (1938). Erfahrungen mit der Trichomonadenseuche in einer Gemeinde. [**Experience of Bovine Trichomoniasis**].—*Tierärztl. Rdsch.* **44**. 170-174.

II. BELLER, K., SCHAAF, J., & SCHIERLE, H. (1938). Die Pathogenität der Geschlechts-trichomonaden des Rindes. [**Pathogenicity of Bovine Genital Trichomonads**].—*Arch. wiss. prakt. Tierheilk.* **73**. 171-187. 1 table. [15 refs.]

I. A general clinical article in which the role of the bull in spreading the disease is referred to. Rivanol and entozon irrigations were found useful for curative purposes.

II. A young bull was successfully infected with trichomonads by a series of intrapreputial injections of culture, and by causing it to serve an infected cow. The bull then transmitted the infection to heifers, but even at this time it was very difficult to demonstrate the presence of trichomonads in the genital organs of the bull. It is therefore suggested that in order to diagnose trichomoniasis in bulls it is advisable to cause them to serve uninfected cows and to examine the latter for the parasites after they have had time to contract infection.

A number of cows were infected *per vaginam* by trichomonad cultures and the course of infection was studied. It was found that the organisms entered the uterus and ceased to be demonstrable in the vaginal secretion. Abortion only occurs when there is a massive infection causing macroscopic changes in the uterus, foetal membranes and foetus. Trichomoniasis may coexist with genital vesicular exanthema in an animal [see *V. B.* **5**. 487].—V. CHLÁDEK (PRAGUE).

HEGNER, R., & ALICATA, J. E. (1938). **Trichomonad Flagellates in Facial Lesions of a Pig.**—*J. Parasit.* **24**. 554.

Many trichomonads, together with *Pseudomonas pyocyaneus* and *Actinomyces*, were found in necrotic tissue underlying bilateral facial thickenings in a young pig. It is suggested that buccal flagellates invaded the necrotic tissue, which extended close to the facial bones, where they found suitable conditions for growth and reproduction. The cause of the lesions was not ascertained.—M. L. BINGHAM.

HOGUE, Mary Jane. (1938). **The Effect of *Trichomonas foetus* on Tissue Culture Cells.**—*Amer. J. Hyg.* **28**. 288-298. 6 figs. on 3 plates. [12 refs.]

Little is known of the effect of *T. f.* on the tissues of the host. The experiments describe its effect on tissue culture cells. The organism was found to produce a substance which kills the tissue cells, and filtrates of a 17-day-old culture killed the tissue culture cells as quickly as the living organism. Heating at 55°C. for 15 minutes only slightly lowered the toxicity. The tissue culture cells react to *T. f.* (1) by becoming granular and dying fairly quickly, (2) by forming vacuoles and dying more slowly, or (3) by contracting.—S. J. GILBERT.

GIBBONS, W. J., & BAKER, D. W. (1939). **Coccidiosis [in Cattle].**—*Cornell Vet.* **29.** 182-191. 1 fig., 1 table.

The authors record ten outbreaks of coccidiosis affecting 44 cattle, of which 18 died. Statistics show that there was a marked increase in the number of cases in New York State in 1937-1938. Details are given of the clinical symptoms, results of faecal examinations, and of P.M. examinations. Treatment included the administration of intestinal disinfectants and astringents, and, in very severe cases, intravenous injections of 500-1,000 c.c. of citrated blood and 1,000-2,000 c.c. of 5% dextrose in normal saline; rectal injection of warm mineral oil, together with epidural anaesthesia to permit the retention of the oil, was useful for the relief of tenesmus. Seven of the outbreaks occurred on immediately adjacent farms, and the topographical features of the area are discussed in relation to the possible means of spread of the infection, as surface drainage appears to have played an important part in transmission.—M. L. BINGHAM.

I. YAKIMOFF, W., & TIMOFIEIEFF, P. (1939). Inclusion dans les oocystes d'*Eimeria labbeana* Pinto, 1928. [**Inclusion Bodies in the Oocysts of *E.I.***]—*Bull. Soc. Path. exot.* **32.** 283-284.

II. YAKIMOFF, W., & TIMOFIEIEFF, P. (1939). Sur la sporulation anormale d'*Eimeria labbeana* Pinto, 1928. [**Abnormal Sporulation of *E.I.***]—*Ibid.* 284-285.

I. Records the detection of motile micro-organisms resembling bacteria in the sporulating oocysts of *E.I.* between the membranes of the oocyst wall and the protoplasmic contents. In some cases the organisms invaded the protoplasm. These inclusions were not detected in oocysts sporulated in solutions of potassium bichromate.

II. Discusses the records of abnormal sporulation in such species as *Isospora rivolta* and *I. felis*, and reports the detection of oocysts of *E.I.* of the pigeon in which there were only two sporocysts each containing four sporozoites. The authors are convinced that the oocysts were not those of an *Isospora*.—U. F. R.

BECKER, E. R., & WATERS, P. C. (1939). **Dried Skim Milk and Other Supplements in the Ration During Caecal Coccidiosis of Chicks.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 439-442. [2 refs.]

BECKER has shown [*V.B.* **9.** 176] that powdered skim-milk in certain formulae for chick rations seems to have coccidium-stimulating properties. Experiments on the effects of buttermilk were also conducted by the authors who showed that dried milk in the ration had an unfavourable effect upon the course of experimental caecal coccidiosis. The present paper affords further evidence which reveals the unfavourable effect of dry buttermilk in the ordinary growing ration and that dry skim-milk has a similar effect. Little difference in mortality or weight gain was noted when soya bean meal was substituted for a large part of the meat element in scraps, or when sardine meal took the place of dry milk.

—C. HORTON SMITH.

I. WOLFSON, F. (1938). **The Common Duck as a Convenient Experimental Host for Avian Plasmodium.**—*Amer. J. Hyg.* **28.** 317-320. 1 table. [4 refs.]

II. HEWITT, R. (1938). **Multiple-Infected Red Cells in Avian Malaria.**—*Ibid.* 321-344. 3 text figs., 20 figs. on 1 plate, 7 tables. [19 refs.]

III. HEGNER, R., & ESKRIDGE, Lydia. (1938). **Passive Immunity in Avian Malaria.**—*Ibid.* 367-376. 2 figs. [4 refs.]

IV. MANWELL, R. D. (1938). **The Identification of the Avian Malarías.**—*Amer. J. trop. Med.* **18**. 565-575. 1 table. [Numerous refs.]

V. JAMES, S. P., & TATE, P. (1938). **Exo-Erythrocytic Schizogony in *Plasmodium gallinaceum* Brumpt, 1935.**—*Parasitology*. **30**. 128-139. 18 figs. on 2 plates. [Numerous refs.]

I. W. showed that a strain of *Plasmodium cathemerium* isolated from a wood thrush could be transmitted to a 8-days-old duck as well as to a canary, and that blood from this duck was infective when sub-inoculated into normal ducks and canaries. He concludes that the duck may serve as a convenient host for experiments on bird malaria.

II. H. refers briefly to the theories suggested by various workers to explain the presence of multiply-infected red cells in malarial infections; his observations support the theory that penetration by merozoites is into specially "susceptible" young cells. The asexual cycle of *Plasmodium cathemerium* lasts for 24 hours; for the first 12 hours he found that the number of multiply-infected cells gradually increased, but as the cycle progressed, they rapidly diminished in number until after 20 hours no cells contained more than two parasites, and the majority contained only one. The frequency of multiply-infected cells was proportional to the ratio between the number of parasites and the number of young red cells present. In phenylhydrazine-treated birds the young red cells increased in number, resulting in fewer cells being infected by more than one parasite.

III. Attempts were made to immunize canaries against a virulent strain of *Plasmodium cathemerium* by the use of large quantities of serum derived from (a) uninfected birds, (b) birds with a latent infection and (c) birds with acute infections; administration of serum was followed a week later by injection of the parasites. Three birds were used in each group. Birds treated with serum from uninfected birds showed less resistance than untreated control birds, whilst those injected with serum from birds with latent infection suffered a severe reaction and two died. The group treated with serum from acute cases remained apparently unaffected, although showing a large number of parasites in the red blood cells.

IV. The identification of species of avian malaria parasites is based chiefly on their morphology as seen in the blood of the vertebrate host, and also on the characteristics of the infection in the canary. The classification is given in key and tabular form, and twelve species are differentiated, nine of which M. considers are valid species; there is much variability even within a given species and some stages of certain species resemble corresponding stages of others very closely. Also, there is evidence of the existence of races within a species which differ among themselves, e.g., the various races of *Plasmodium praecox* differ in the length of their asexual cycle.

V. The term *exo-erythrocytic schizogony* refers to the schizogonic cycle of *P. gallinaceum* which occurs in cells, other than erythrocytes. It occurs also in other avian malarial infections. These schizonts grow much larger than intra-erythrocytic schizonts, and produce 50-60 or even more merozoites; they are non-pigmented, since they develop in haemoglobin-free cells such as circulating leucocytes, especially monocytes, and reticulo-endothelial cells in the brain, lung, liver, and spleen. When very numerous in the brain capillaries they occur in rows and may cause occlusion. They may be found in this site simultaneously with the presence of schizonts in erythrocytes in the peripheral circulation. In morphology they closely resemble similar stages of *Haemoproteus*. The possibility of a mixed infection with another parasite, e.g., *Toxoplasma*, is considered but it is suggested that this theory does not fit in with the available evidence.—M. L. B.

- I. MANWELL, R. D., & GOLDSTEIN, F. (1938). **Life History and Immunity Studies of the Avian Malaria Parasite, *Plasmodium circumflexum*.**—*Proc. Soc. exp. Biol., N.Y.* **39**. 426-428. [3 refs.]
- II. ROUBAUD, E., COLAS-BELCOUR, J., & MATHIS, M. (1939). Transmission de *Plasmodium gallinaceum* par *Aedes geniculatus*. [**Transmission of *Pl. gallinaceum* by *Aedes geniculatus***].—*Bull. Soc. Path. exot.* **32**. 28-30. [3 refs.]
- III. HENRY, C. (1939). Pouvoir infestant du sang au cours de l'incubation du paludisme de la poule (*P. gallinaceum*) inoculé par moustiques. [**Virulence of the Blood during the Incubation Period of *Plasmodium gallinaceum* Infection in Hens Infected by Mosquitoes**].—*Bull. Soc. Path. exot.* **32**. 30-35. 1 table. [4 refs.]

I. Six strains of *Pl. circumflexum* were used in the experiments. They were obtained from five different species of hosts and from widely separated localities. The results showed that a chronic infection with one strain protected against subsequent infection with another strain, although the degree of immunity to infection with another strain was less than after super-infection with the same strain. Passive immunity was conferred by repeated injections of serum obtained from chronic cases; the immunity was, however, greater in those birds which received parasites of the strain originally used to infect the donors of the serum, than in those infected with other strains. Regarding life-history, the occurrence of exo-erythrocytic stages of the parasite was confirmed.

II. Eight female *Aedes* were fed on a hen known to be infected with *Pl. gallinaceum*. After 11 days sporozoites were present in the salivary glands of two of the mosquitoes. A healthy cock was exposed to survivors of this batch and its blood was examined daily, but parasites were not found in the blood until 17 days later. *Aedes aegypti*, known vectors of the disease, were used as controls, and the incubation period was much shorter than with *Aedes geniculatus*.

III. 11. investigated the virulence of hens' blood during the incubation period of *Pl. gallinaceum* infection. Two chickens were exposed to infected *Stegomyia albopicta* overnight and from them 10 c.c. of blood were taken and injected intravenously at different periods into healthy hens. Successful results were obtained only in the hens inoculated after the fifth day of the experiment.

Difficulty was experienced in obtaining a pure layer of leucocytes by centrifugation of the blood, and an attempt to ascertain whether leucocytes were infective was not successful.—A. L. WILSON.

- MALBRANT, R., & RAPIN, L. (1939). Sur les piroplasmoses bovines du Tchad. Existence de *Babesiella berbera*. [**The Existence of *B. berbera* in Cattle in the Chad Area**].—*Bull. Soc. Path. exot.* **32**. 485-487.

The importance of piroplasmosis in the Chad region is discussed, and it is pointed out that most animals contract infection in youth and become immune carriers, but that relapses may be produced by rinderpest and other conditions. In examining 11 animals infected with rinderpest, *B. bigemina* was detected in seven animals, and in one case *B. berbera* was also present.—U. F. RICHARDSON.

- WOLF, A., COWEN, D., & PAIGE, Beryl. (1939). **Human Toxoplasmosis: Occurrence in Infants as an Encephalomyelitis. Verification by Transmission to Animals.**—*Science*. **89**. 226-227. [6 refs.]

A protozoon, morphologically resembling *Toxoplasma*, was found associated with a widespread encephalomyelitis with focal necrosis, at the autopsy of a child 31 days of age, which had died after illness characterized by convulsive seizures and disturbance of respiration. The parasite was transmitted by intracerebral

inoculation to mice and rabbits, producing a fatal encephalomyelitis in those animals. Reference is made to four other cases of infection in infants, reported from New York, Chicago, Prague and Rio de Janeiro. The organism has been named provisionally *Toxoplasma hominis*, but it is pointed out that it is probably identical with the toxoplasms of other animals, and not a species specific to man.

—U. F. RICHARDSON.

SABIN, A. B. (1938). **Identification of the Filtrable, Transmissible Neurolytic Agent Isolated from Toxoplasma-Infected Tissue as a New Pleuropneumonia-Like Microbe.**—*Science*. **88**. 575-576. [6 refs.]

S. previously reported [*V. B.* **9**. 156.] the isolation from toxoplasma-infected tissue of a filtrable transmissible agent capable of producing a characteristic nervous disease in mice. This neurolytic agent has been grown in a cell-free medium, consisting of ordinary nutrient broth, 10% Seitz-filtered sterile bovine serum, and 0.5 glucose. Cultures were obtained from each of six infected brains, of which some had been kept in the dried state for months, while others were fresh. Sub-culture of the serum glucose broth cultures on serum agar gave colonies 20-100  $\mu$  in size similar to those described by LEDINGHAM [*V. B.* **4**. 725.] for the causal organisms of contagious bovine pleuro-pneumonia and agalactia.

Eighteen sub-cultures were made and the cultures were as pathogenic to mice as material from infected animals. The agent is filtrable, and its pathogenicity is inactivated at a temperature of 45°C. for 15 minutes. The culture and animal passage material gave complete immunity to each other. Filtration of cultures through Seitz filters yielded a material of which 0.5 c.c., on intravenous injection, but not on intracerebral or intraperitoneal injection, reproduced the typical nervous signs within 1-2 hours in three-week-old mice. Most of these mice died, but the survivors continued to show the same nervous signs and exhibited the same acute necrotic lesion in the posterior pole of the cerebellum, with the acidophilic necrosis of Purkinje cells so often observed in virus diseases. Neither the brain nor the viscera of these mice contained a transmissible agent.

S. reports that a toxin is produced early during growth, is present in very small amounts, and disappears from the cultures within two days of its appearance. It is thermolabile, being inactivated at 50°C. for 30 minutes. It is apparently antigenic, and the same as that produced *in vivo* during infection, since recovered mice are immune to it.

The organism was isolated in pure culture from the brain of a one-month-old healthy mouse and found to be non-pathogenic for mice; cultures contained no toxin. S. therefore concludes that this organism grows in symbiosis with toxoplasma, and that it has been made pathogenic for mice by repeated mouse passage.

HENRY, C. (1939). Présence dans les hématies de poulets d'éléments rappelant les corps de Balfour. [**Elements Resembling Balfour Bodies in Blood Cells of Fowls**].—*Bull. Soc. Path. exot.* **32**. 145-149. 1 fig. [10 refs.]

This is a description of cell inclusions found within the cytoplasm of the erythrocytes of fowls which were used for experiments with *Plasmodium gallinaceum*. In smears stained with May-Grünwald-Giemsa the inclusions appeared as red granular bodies, 0.5-2.5  $\mu$  in diameter, surrounded by a halo and apparently showing evidence of binary and multiple fission. They were found in both diseased and healthy fowls.

The morphology of the bodies suggests their relationship to *Aegyptianella pullorum* (Balfour bodies) or to the parasite described by COLES in 1937 in New York and Philadelphia States [*V. B.* **9**. 286]. Further work on these inclusions is in progress.—E. G. WHITE.

DONATIEN, A., & LESTOQUARD, F. (1939). Sur l'épidémiologie de la conjonctivite granuleuse des ruminants (*Rick. conjunctivae*). [**Epidemiology of Granular Conjunctivitis in Ruminants Due to *R.c.* Infection**].—*Bull. Soc. Path. exot.* **32**. 304-310. [1 ref.]

Examination of lambs from birth showed that initial bodies of *R.c.* might be detectable on the conjunctival mucosa within 24 hours, and in all infected lambs appeared within three days. The initial bodies later developed to elementary bodies which invaded the epithelial cells and caused conjunctivitis. Animals which had recovered from infection showed granulations on the conjunctiva and membrana nictitans. It was shown that infection of the nasal mucous membrane might occur and thus the nasal discharge may be infective.

Infection in lambs isolated with their mothers was less severe than that of flock lambs. Infection was shown to persist for 63 days, but it is considered that it probably survives much longer and that parturition precipitates a relapse which acts as the source of infection for the lamb. Apparently recovered animals when reinoculated might suffer a second severe clinical reaction or might fail to react. If reinoculation is repeated the reactions become progressively milder.—U. F. R.

GIROUD, P., & PANTHIER, R. (1939). Aspect de phagocytose bactérienne pouvant simuler des rickettsies au niveau des conjonctives. [**Bacterial Phagocytosis on the Conjunctiva May Simulate Rickettsia**].—*Bull. Soc. Path. exot.* **32**. 464-466. 4 figs. on 2 plates.

The conjunctivae of cattle in three areas in which epidemic conjunctivitis did not exist were examined, and inclusion bodies resembling rickettsia were detected in the conjunctival epithelium. It is concluded that these inclusions were bacteria which had been phagocytosed by the conjunctival cells. The inclusions differed from rickettsia in that they did not exhibit the same selective staining affinities, and in that their contour was often badly defined. The size varied between  $0.2\mu$  and  $0.5\mu$ , and they might be very numerous or only scantily present in the protoplasm of the cells.—U. F. RICHARDSON.

WALCH-SORDRAGER, B., & SCHÜFFNER, W. (1938). Die Selbständigkeit der *L. canicola*. [**The Autonomy of *Leptospira canicola***].—*Zbl. Bakt. I. (Orig.)*. **141**. 97-109. 10 tables. [18 refs.]

*L.c.* can be distinguished from other leptospira by serological tests, the clinical syndrome, experimental infection and the epidemiological character of the disease. Agglutination and lysis tests are those used. The infection in dogs is characterized by the prevalence of fatal nephritis. Icterus is infrequent and slight. Mild forms are also observed in which there are no clinical symptoms, although leptospira are present in the urine and may persist for some months. *L.c.* infection is about one-third more frequent in dogs than *L. icterohemorrhagiae* infection. The latter is characterized by a severe icterus. In 13 cases of *L.c.* infection in man there was no icterus and all recovered, whilst in two thirds of the human cases of *L.i.* infection there was icterus, and one fifth of the cases were fatal. *L.c.* infection of rabbits is a subacute or even chronic disease, whilst infection with *L.i.* soon leads to death. Rats are more resistant to *L.c.* than to *L.i.*, the former organism never being present in the urine, whereas the latter always is. Rats are known universally as carriers of *L.i.*, but a rat infected with *L.c.* has never been found, this organism occurring only in dogs and, exceptionally, in man.

—V. CHLÁDEK (PRAGUE).

WELCKER, A. (1938). Die Laboratoriumsinfektionen mit Weilscher Krankheit. [**Laboratory Infections with Leptospira**].—*Zbl. Bakt. I. (Orig.)*. **141**. 400-410. [Numerous refs.]

The paper explains the need for the German regulation of 1936 enforcing the use of goggles and rubber gloves in laboratory work in connexion with leptospirosis in rats and dogs. Laboratory infections with Weil's disease are frequently traceable to apparently healthy animals, and sometimes occur in laboratories not concerned with work on leptospira. Only a portion of the accidentally acquired infections have been reported in the literature.

Leptospira are able to penetrate the intact skin. About 40-50% of apparently healthy wild rats are vectors of spirochaetes, so that direct contact with rat urine is dangerous; 21% of 48 dogs with various diseases tested gave positive serological reactions for leptospirosis, and many dogs are probably continuous excretors of spirochaetes. Leptospira occur occasionally in cats. Diagnosis by the experimental infection of rabbits is uncertain, as older rabbits have some resistance to the infection.—V. CHLÁDEK (PRAGUE).

### DISEASES CAUSED BY VIRUSES

GERLACH, F. (1938). Ueber Versuche zur Sichtbarmachung und Züchtung spezifischer Mikroorganismen bei Virus-Infektionskrankheiten und bösartigen Geschwulsten. [**Microscopy and Cultivation of Specific Micro-Organisms in Virus Diseases and Malignant Neoplasms**].—*Wein. tierärztl. Mschr.* **25**. 165-188. 20 text figs., 4 figs. on 1 plate.

Two methods of staining virus bodies were used (1) victoria blue as a direct stain, (2) primulin in conjunction with ultraviolet light (fluorescent staining). Such bodies were demonstrated in the viruses of the various poxes, ectromelia, rabies, Aujeszky's disease, dog distemper, foot and mouth disease, poliomyelitis and influenza.

In addition bodies could be seen in bacteria-free filtrates prepared from malignant neoplasms, and in filtrates of isotonic solution suspensions of squashed tumours. These filtrates, when sown on various suitable media and incubated for 3-6 days, gave minute colonies visible under a hand lens. Suspensions of these colonies gave similar bodies but they failed to cause malignant disease when injected into hosts susceptible to the original tumour, and G. considers that a "disposition factor" is necessary before the neoplasms can develop.—P. S. WATTS.

LANFRANCHI, A. (1938). Esame di revisione di alcuni capitoli della febbre aftosa. [**Notes on Foot and Mouth Disease**].—*Nuova Vet.* **16**. 331-342. [2 refs.]

L. notes that the disease is apt to occur in cycles, a period of virulent mortality and wide-spread infection being followed by a number of years during which cases are few and mortality low. He describes the bacilli encountered in the lesions, and the extent to which their action is of importance in F. & M. disease. He discusses at length the methods of immunizing animals against the disease. He has noted cases in which cattle vaccinated against anthrax have failed to contract foot and mouth disease when exposed to severe infection. This he ascribes to non-specific acquired immunity.—S. J. HODGMAN.

KAMMEL, O. (1938). Futterungsfragen bei der Maul- und Klauenseuche. Bemerkenswerte Beobachtungen eines schlesischen Veterinärates. [**Dietetics of Cattle with Foot and Mouth Disease**].—*Tierärztl. Mitt.* **19**. 521-522.

K. gives a clinical account of F. & M. disease, describing the common complications and giving advice on the treatment of the various forms of the disease and on diet for affected animals.—A. T. PHILIPSON.

HONEKER. (1988). Das klinische Bild bei Maul- und Klauenseuche der Ziegen. [**Foot and Mouth Disease in Goats**].—*Berl. tierärztl. Wschr.* Jan. 14th. 17-20. [Numerous refs.]

An account of F. & M. disease in goats, with reference to naturally-contracted and artificial infection [see also REPPIN. (1929). *Arch. wiss. prakt. Tierheilk.* **60**. 166].

SALLINGER. (1939). Maul- und Klauenseuche beim Rehwild. [**Foot and Mouth Disease in Roe Deer**].—*Berl. Münch. tierärztl. Wschr.* Feb. 10th. 89. 1 fig.  
A record of F. & M. disease diagnosed clinically in two roe deer.

—V. CHILÁDEK (PRAGUE).

WOLF, J. (1939). Die Empfänglichkeit des Igels für die Maul- und Klauenseuche. [**Susceptibility of the Hedgehog to Foot and Mouth Disease**].—*Berl. Münch. tierärztl. Wschr.* Jan. 6th. 4-6. 2 tables. [4 refs.]

Of five hedgehogs inoculated with type A virus direct from an outbreak through scarifications in their soles, two became infected. In further experiments marked lesions developed in four hedgehogs similarly inoculated with virus passed through g. pigs, and also in hedgehogs which were housed together with those inoculated. No infection resulted, however, when hedgehogs were kept for a considerable time in contact with material contaminated with the saliva of diseased cattle, or were fed milk to which vesicle material from the tongues of diseased cattle was added. W. concludes that although the hedgehog may occasionally be infected by inoculation, in its natural life it is not likely to be an important factor in the distribution of F. & M. disease, as was suggested by HULSE and EDWARDS [*V. B.* **9**. 16].

I. MOLDENHAUER, W. (1938). Die Gewinnung von Rekonvaleszentenserum gegen Maul- und Klauenseuche in der warmen Jahreszeit. [**Production of the Convalescent Serum Against F. & M. Disease during the Warm Season**].—*Tierärztl. Rdsch.* **44**. 501-503. 2 figs.

II. RÖHRER, H. (1938). Erfahrungen bei der Herstellung von MKS-Rekonvaleszentenserum. [**Preparation of F. & M. Disease Convalescent Serum**].—*Berl. tierärztl. Wschr.* June 24th. 365-367.

I. Crude emergency field methods of preserving blood for a limited time are described. Defibrinated blood is placed in cans and an ice-salt freezing mixture is used to maintain the low temperature.

II. B. describes the preparation of serum from convalescent animals. There is no new information.—HANS GRAF (ZÜRICH).

I. JOST, J. (1988). Ist Maul- und Klauenseuche auf den Menschen übertragbar und wie kann man sich eventuell davor schützen? [**The Prevention of Foot and Mouth Disease in Man**].—*Z. ärztl. Fortbildg.* **35**. 79-80.

II. WAGENER, K. (1988). Die Maul- und Klauenseuche als medizinisches Problem. [**Foot and Mouth Diseases as a Medical Problem**].—*Med. Klinik.* **34**. 173-175. 2 figs. [Abst. from abst. in *Zbl. Bakt. I. (Ref.)*. **129**. 199].

- III. ROCHAIX, A., & DELBOS, J. (1988). Sur la contagiosité de la fièvre aphteuse de l'animal à l'homme. [**The Infectivity of Foot and Mouth Disease for Man**].—*Rev. Hyg. Méd. prév.* **60**. 921-930. [Copied verbatim from *Bull. Hyg., Lond.* **13**. 975. Signed: R. L.].

I. A brief account of the disease in man, including the nature of the syndrome and the methods of infection.

II. A general account of F. & M. disease in cattle, with a description of the syndrome in man.

G. pigs should be inoculated for diagnosis. Human beings are not carriers and excretors of the virus, although they are, after the susceptible animals, the commonest means of mechanically spreading the disease.

III. Two cases of disease are reported following the partaking of unboiled milk or milk products, and the epidemiological and clinical evidence suggest them to be cases of foot and mouth disease in the human subject. A general discussion follows this brief record on whether this disease is transmissible to man, and the conclusion is drawn that there is not sufficient evidence to prove its transmissibility or non-transmissibility. It is suggested that human beings are slightly susceptible, but that the disease can only develop under certain circumstances. A further suggestion is that children may suffer from a gastro-enteritis after consuming milk from cows with this disease, and therefore in their interests the milk from such sources should be boiled or pasteurized. [This problem hardly arises in this country where foot and mouth disease is so rigorously controlled].

- I. PERAGALLO, I. (1937). Studi sul virus aftoso. [**Foot and Mouth Disease Virus Passaged on Fowl Embryos**].—*G. Batt. Immun.* **19**. 30-32. 2 figs. [English, French, and German summaries].

- II. NEGRI, R. (1937). Sulla cultura del virus dell'afta epizootica. [**Culture of F. & M. Disease Virus**].—*Profilassi.* **10**. 225-227.

I. P. states that F. & M. disease virus can be cultured on the chorio-allantoic membrane of fowl embryos on the 14th day of incubation; 36-48 hours later characteristic vesicles are formed, radiating from the inoculation point over the whole surface of the membrane. Usually these vesicles are smaller and more numerous than those of vaccinia obtained by the same method.

II. N. briefly reviews the methods suggested by various authors for the culture *in vitro* of the F. & M. disease virus. In his opinion the problem of control of F. & M. disease is most likely to be solved by the active immunization of the susceptible animals with the help of a sufficiently active virus available in sufficient quantities.

- RECEVEUR, M. (1988). Notes sur certaines affections du cheptel des régions nord-est du Tchad. La peste bovine expérimentale. [**Notes on some Affections of Livestock in the North-East of the Chad District. Experimental Rinderpest**].—*Rec. Méd. vét. exot.* **11**. 159-166. [1 ref.]

This is a description of rinderpest affecting the bovines of a country where the disease is endemic, and in particular of 2,500 of these cattle which were artificially infected for the production of anti-rinderpest serum. The disease apparently differs in no important detail from that in other countries where it is endemic. There is however one unusual symptom described, namely, a very marked atrophy of the muscles of the croup and thigh from which recovery is very slow.—G. W.

- I. LYON, B. M. (1989). **Present Status of Equine Encephalomyelitis and Its Control**.—*Cornell Vet.* **29**. 198-216. 6 tables.

- II. FARQUHARSON, J. (1989). **Infectious Equine Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **94**. 459-465. 3 figs. [2 refs.]
- III. RANDALL, R. (1989). **Notes on the New England Outbreak of Equine Encephalomyelitis.**—*Vet. Bull. U.S. Army.* **33**. 87-95. 2 tables. [11 refs.]
- IV. ANON. (1989). **Equine Encephalomyelitis—1938.**—*Ibid.* 180-182. 1 table, 1 map. [1 ref.]
- V. OSTEEN, O. W. (1989). **Infectious Equine Encephalomyelitis: Mid-Winter Case.**—*J. Amer. vet. med. Ass.* **94**. 441-442.

I. During 1988 equine encephalomyelitis extended its sphere to the greater part of the U.S.A., but the eastern and western viruses remained confined to their respective territories east and west of the Appalachian mountains. Many species besides equines were recognized as hosts, including man, and a number of fatal cases in human beings occurred. The mode of transmission has been established, mosquitoes, ticks, and other blood-sucking insects being incriminated as vectors. Ticks are considered to be the most likely inter-seasonal virus hosts.

Laboratory diagnosis is not yet entirely satisfactory. Frequent instances occur in which virus cannot be recovered from brain tissue even in the most typical clinical cases.

Immunization of the susceptible host remains the most fruitful method for the control of the disease. Active immunization with chick-embryo vaccine gives outstandingly successful results, and a new concentrated antiserum is expected to render passive immunization more effective than hitherto.

II. Clinically the disease usually assumes the form of a lethargic encephalitis, although its early stages may be manifested by hyperaesthesia. Young animals generally tend to respond better to treatment than older subjects. In acute cases complete paraplegia occurs in a few hours, and death soon follows. Horses which recover sometimes develop mental peculiarities, such as a dislike to entering stables or passing through gates; this condition is known as "post-encephalitis disease". In treatment of well-established cases, rest, quiet, and measures to overcome dehydration afford better chances of success than serum dosage. Chick-embryo vaccine procures rapid immunity, and is therefore effective, not only before, but during an epizootic.

III. It is estimated that 326 cases of equine encephalomyelitis occurred in Massachusetts during 1938. Of the other New England states 40 cases were recorded in Connecticut, 30 in Rhode Island, 2 in Maine, and 6 in Vermont. The U.S. Army had 40 horses on pasture at Canton, Mass. which is in the epizootic area. During August one of these animals showed symptoms of colic, and after three or four hours became prostrate. It became very violent and its temperature rose to over 108°F. Symptomatic treatment was given, but death occurred about 11 hours after the initial symptoms appeared. The remaining horses seemed normal and were vaccinated next day with chick-embryo vaccine. Two days later another horse became ill, and showed typical symptoms of encephalomyelitis. Examination of the brain immediately after destruction of the animal revealed the presence of virus. Two other animals showed symptoms of the subclinical type of the disease, but no more severe cases occurred. In all 323 army horses in Massachusetts were vaccinated during the outbreak, with only the two losses above.

IV. In 1988, 184,662 cases of the disease were reported in U.S.A. The incidence was 28.6 cases per 1,000 horses in the 39 states involved, and the mortality was 21.4%. In Eastern states the incidence was 39 cases per 1,000 animals with a mortality of 90.2%, while the figures for Western states were 24.8 per 1,000 and 19.8% respectively.

39 cases with 15 deaths were reported from the army with an incidence of

5.4 cases per 1,000 animals on infected stations. The incidence among all army animals in U.S.A. was 1.9 per 1,000. The incidence of the disease was kept as low as possible by restriction of movement of animals into mosquito-infested epizootic areas. Early in the spring of 1939 all army horses were vaccinated with the chick-embryo vaccine.

V. In the U.S.A. cases of equine encephalomyelitis usually occur only during the months of July, August and September. A typical case of the disease was recorded, however, from Ocala, Marion County, Florida in January, 1939, from which the eastern type of the virus was isolated. The horse had not been vaccinated previously. The week prior to illness had been exceptionally warm, temperatures eight or nine degrees above the normal being recorded. Mosquitoes were active at the time.—D. D. OGILVIE.

VAN ROEKEL, H., & CLARKE, Miriam K. (1939). **Equine Encephalomyelitis Virus (Eastern Type) Isolated from Ring-Necked Pheasant.**—*J. Amer. vet. med. Ass.* **94**. 466-468. [5 refs.]

Two ring-necked pheasants from a New Jersey flock which had previously suffered heavy losses were found to be infected with the eastern type of equine encephalomyelitis virus. Diagnosis was effected by cross-immunity tests with g. pigs, and neutralization tests with equine hyperimmune serum. A number of other susceptible hosts in nature were also detected, including the English sparrow, and the mouse.—D. D. OGILVIE.

I. VON MÓCSY, J. (1938). Untersuchungen über die Natur des Anämievirus der Einhufer. [**The Nature of the Virus of Equine Infectious Anaemia**].—*Arch. wiss. prakt. Tierheilk.* **73**. 25-31.

II. WITTFOGEL, H. (1938). Der Wert des Meerschweininfektionsversuches für die Erkennung der ansteckenden Blutarmut der Einhufer. [**The Use of the G. Pig Infection Test for the Diagnosis of Equine Infectious Anaemia**].—*Z. InfektKr. Haustiere.* **53**. 148-157. [19 refs.]

I. Trials to find the blood fraction associated with the virus revealed the infectivity of the blood globulin and blood albumin, the dialysate being non-infective. The virus appears either to be attached to these blood proteins or is itself of protein nature. The author believes, although he gives no evidence, that the virus is apparently lifeless, and that its augmentation is due to abnormal metabolism of the infected animal. Large doses of X-rays, lethal to living cells, produce no harmful effect upon the virus. The author is continuing his investigations.

II. Experiments on 84 g. pigs, some injected with the virus of equine infectious anaemia, and some inoculated with normal horse blood, to eliminate the possibility of a non-specific albumin reaction, revealed that the g. pig inoculation test has no value whatever for the diagnosis of the disease. Clinical, haematological, pathological and histological examinations showed no specific changes in the g. pigs referable to the virus.—V. CHLÁDEK (PRAGUE).

WALDMANN, O., & KÖBE, K. (1937). Kritische Bemerkungen zu den Versuchen über die Aetiologie der Grippe bei Mensch und Tier. [**Aetiology of Influenza in Man and Animals**].—*Zbl. Bakt. I. (Orig.)* **138**. 153-158. [9 refs.]

The authors review their own work and that of Shope in a comparative manner, and conclude that pneumotropic viruses are the cause of influenza-like conditions in pigs (swine and piglet influenza) and in cattle and horses (infectious

bronchitis). In each case the infection can be induced by intranasal instillations of bacteria-free filtrate, whilst in each case secondary bacterial infection may complicate the condition and render it more severe. In pigs the secondary invader is *Haemophilus influenzae suis*, in horses haemolytic streptococci and in cattle non-haemolytic streptococci or *Pasteurella septica*. The similarities between these conditions and human influenza are discussed.—E. J. PULLINGER.

- LAMONT, H. G., & KERR, W. R. (1939). **Infectious Pneumonia of Calves or Calf Influenzal Pneumonia.** [*? Haemophilus influenzae*].—*Vet. Rec.* **51**. 672-674.  
 GILMORE, H. D. (1939). **Infectious Calf Pneumonia or Calf Influenzal Pneumonia.**—*Ibid.* 674.

I. A preliminary account of transmission experiments to determine the aetiology of a type of calf pneumonia which is stated to be widespread in Northern Ireland. At least three different organisms have been isolated from the lungs, *viz*, a bipolar organism, *Corynebacterium pyogenes*, and an organism which corresponds to *Haemophilus influenzae* of piglet influenza. The experiments recorded in this paper, however, indicate that the exciting cause is a filtrable virus. The disease could be transmitted by direct contact between healthy and affected calves, and by muslin filtrates of ground-up pneumonic lungs; 15 c.c. of a muslin filtrate passed through a Berkefeld or a Seitz filter and then injected intranasally into healthy calves produced typical pneumonia. Treatment of affected calves in natural outbreaks with M & B 693 is stated to have given excellent results.

II. A clinical description of the outbreak described in I.—N. J. SCORGIE.

- I. PERAGALLO, I. (1937). Coltura del virus rabbico nella membrana corion-allantoidea dell'embrione di pollo. [**Cultivation of Rabies Virus on the Chorio-Allantoic Membrane of the Egg Embryo**].—*Ann. Igiene (sper.)*. **46**. 421-425. 5 figs. on 2 plates.  
 II. KLIIGLER, I. J., & BERNKOPF, H. (1938). **Cultivation of Rabies Virus in the Allantois of the Developing Chick Embryo.**—*Proc. Soc. exp. Biol., N.Y.* **39**. 212-214. [1 ref.]

I. P. inoculated the chorio-allantoic membrane of 15-day incubated eggs with rabbit-brain rabies virus, and obtained growth of the virus as judged by the ability to carry it over 18 passages, by periodic rabbit inoculation tests and by the demonstration of Negri bodies in the egg embryo tissue. The Negri bodies are illustrated in colour and a comparison is made of these and of Guarnieri bodies.

II. The authors collected virus 2 hours to 14 days after inoculation from 10 out of 22 eggs, and only secured two sub-cultures. They were unable to obtain any definite multiplication of virus. Particulars of technique are given.—J. E.

- MILAM, D. F. (1939). **The Effect of Various Diluents Acting for Short Periods on Rabies Virus in High Dilutions.**—*Amer. J. trop. Med.* **19**. 297-301. 3 tables. [6 refs.]

Fresh rabies passage virus was diluted in tenfold serial dilutions up to  $10^{-7}$  with distilled water, normal saline, "serum water", "serum saline", "serum-Tyrode solution", serum broth, or by hormone broth, the suspension being allowed to stand for intervals up to 24 hours, and then being injected into mice intracerebrally.

"Serum-Tyrode solution" had the least harmful effect on the virus, and hormone broth was the most injurious.—J. E.

- I. NOURY, M. (1937). Rapport sur le fonctionnement du service antirabique, du 1er Janvier au 31 Décembre, 1936. [**Report on the Rabies Service, Morocco, in 1936**].—*Arch. Inst. Pasteur Maroc.* 1. 921-926.
- II. NOURY, M. (1937). Rapport sur le fonctionnement du service antirabique du 1er Janvier au 31 Décembre, 1937. [**Report of the Rabies Service, Morocco, in 1937**].—*Ibid.* 927-931.

I. 1,217 persons were treated with anti-rabic vaccine. The method used is that of the Pasteur Institute of Paris; cords dried at 28°C. are stored in neutral glycerin at 4°C. Daily inoculations of 8 c.c. are given, the treatments ranging from 15-25 days according to the indications in each case and with cord dried from two to five days. 444 Europeans and 778 natives received treatment. Analyses are given of the species of biting animals incriminated, characters and sites of the wounds, and districts in which persons were bitten. 12 deaths occurred; 4 of these took place during treatment and 4 within 12 days following treatment, before the full effect of the vaccine had been produced. The figures show an increase of rabies compared with previous years.

II. 297 Europeans received treatment and 588 natives. Six deaths were recorded, of which 4 occurred during treatment and one in less than 15 days from completion of treatment. Analyses of species of biting animals, sites and types of wounds etc. are also given.—S. J. GILBERT.

- KLIGLER, I. J., & BERNKOPF, H. (1938). **Studies on Antirabic Immunization with Formolised Culture Virus.**—*Brit. J. exp. Path.* 19. 378-388. 3 tables. [6 refs.]

The vaccine material consisted of tissue culture incubated for four or five days, centrifuged and the sediment triturated and suspended in the supernatant fluid. 0.1% formalin was then added. The experiments were performed on mice and were designed to ascertain the immunizing effect of (1) varying doses and number of injections of formolized cultures, (2) formolized cultures followed by intraperitoneal or subcutaneous infection with active brain virus, and (3) live culture virus. The formolized cultures showed considerable immunizing capacity for mice if injected intraperitoneally. The immunity was incomplete against intracerebral injection of test virus but was more easily established against intraperitoneal or subcutaneous infection. Immunized mice which survived intraperitoneal infection were more immune than surviving untreated test mice. Only half the mice which survived an intraperitoneal infection without previous vaccination were immunized to an intracerebral infection, whereas 84% of previously immunized mice proved immune. Intraperitoneal infection with virus culture of low virulence gave a high degree of immunity against intracerebral infection with test brain virus.

—S. J. GILBERT.

- BALOZET, L. (1938). Etat actuel de nos connaissances sur la rage dans les contrées tropicales et sub-tropicales et sa prophylaxie. La vaccination préventive des chiens. [**Present State of Knowledge and Prophylaxis of Rabies in Tropical and Sub-Tropical Countries. Preventive Vaccination of Dogs**].—*Arch. Inst. Pasteur Tunis.* 27. 450-469. [1 ref.]

Rabies has a world-wide distribution with the exception of a few European countries and Australia, New Zealand and the Pacific Islands. It assumes more importance in tropical and sub-tropical countries where methods of suppression are insufficient or absent, or where perhaps there are difficulties in view of local conditions.

B. reviews the distribution, the transmitting agents (the wild animals that

maintain the infection), varieties of the disease or of virus, the preventive measures, and vaccination. In most countries dogs are chiefly concerned in the spread of rabies, but in South Africa certain felines and Viverridae are of importance, whilst jackals and hyenas are the principal animal vectors in many countries. The paralytic rabies of South America is transmitted by blood-lapping bats. Certain forms of rabies may be mistaken for Aujeszky's disease or Borna disease. Ouloufato, a disease of dogs in West Africa has now been proved to be rabies. In the prevention of rabies, the destruction of dogs and cats which have been bitten by rabid animals, and control of the numbers of dogs and their registration and taxation are necessary measures. Some countries have added as an accessory measure preventive vaccination. Phenolized vaccine with or without glycerin, is most commonly used, but in any case killed vaccines are preferable. The choice of the fixed virus used for vaccine production is important and the technique employed should be adapted to the virus used. Post-vaccination paralysis appears to be more frequent with certain viruses.

In animals good results have not followed the use of vaccine after infection, and dogs which have been bitten by rabid or suspected rabid animals should be destroyed. Preventive vaccination of dogs before they are exposed to danger of infection is giving satisfactory results in some countries but should not replace the regulations to prevent the spread of the disease.—S. J. GILBERT.

OTT, G. L. (1939). **Treatment of Fox Distemper.**—*J. Amer. vet. med. Ass.* **94**, 522-525. 1 fig., 4 charts.

Treatment with anti-dog-distemper serum, prepared in dogs, was effective in reducing the losses resulting from distemper in a large silver fox ranch. Before treatment was begun, there had been an average annual mortality of 35-60% in animals "on the fur range" (i.e., animals 8-10 months old) during the months of October, November and December. During 1938, 11,826 fox pups each received 10 c.c. of anti-canine distemper serum, whilst 7,523 were left as untreated controls. The mortality in the treated group was 10.5%, and in the untreated group 21.1%. The pups came from different breeding ranches, but all animals "on the fur range" were kept under identical conditions. It is stated that the use of serum was satisfactory as the animals were "pelted" about two months after entry to the "fur range". [It is not clear why a single dose of serum alone gave protection].

—N. J. SCORGIE.

SYBESMA, R. P. (1937). **Waarom is Nederland niet meer voldoende tegen pokken beschermd? [Pox in Holland].**—*Tijdschr. Diergeneesk.* **64**, 1230-1236.

S. adduces evidence from official data and from observations by doctors and veterinary practitioners indicating that since 1925 human and cow pox in Holland have gradually lost virulence; at present, effective pox vaccine cannot be prepared from the existing cow-pox virus. For this reason he believes that obligatory vaccination with locally prepared vaccines would not protect the Dutch population from the introduction of pox from outside Holland.

CHADHA, S. R. (1939). **Sheep-Pox and its Control in the North-West Frontier Province.**—*Indian J. vet. Sci.* **9**, 81-85. 1 plate. [4 refs.]

A sensitized vaccine was tried; fresh vesicle material from a natural case was mixed with serum from a recovered ram and kept for 3 days at 16-18°C., triturated, diluted and given subcutaneously. Seventy-seven animals were vaccinated. The vaccination gave rise to a local swelling and a febrile reaction at the fifth day; temperatures returned to normal after two days, but the local reaction persisted for

some days. The vaccinated animals were subsequently exposed to natural infection and appeared immune.—H. E. HARBOUR.

- I. LEVADITI, C., STAMATIN, L., REINIÉ, L., & LE-VAN-SEN. (1989). Ultra-virus et fluorescence. Nombre des corpuscles élémentaires vaccinaux et virulence nevraxique (neurovaccin et dermovaccin). [**Ultraviruses and Fluorescence. Relation between Number of Elementary Bodies and Neurotropism of Vaccinia Virus**].—*C. R. Soc. Biol. Paris*. **130**. 1091-1094. [4 refs.]
- II. LEVADITI, C., & REINIÉ, L. (1989). Ultravirus et fluorescence. Virulence cutané et nombre des éléments corpusculaires vaccinaux (neurovaccin), en fonction de l'origine de ces éléments. [**Ultraviruses and Fluorescence. Virulence for the Skin and Number of Vaccinia Elementary Bodies (Neurovaccine)**].—*Ibid*. 1094-1096. [1 ref.]

I. The relationship between the number of elementary vaccine bodies (N.b.) per unit volume and the minimum vaccinal dose (m.v.d.) has been noted to vary according to the strain of virus and the infective tissue used. This article summarizes experiments with neurovaccine and dermovaccine which substantiate this relationship. The authors conclude that the N.b. of neurovaccine in the m.v.d. varies according to whether intracranial or intradermal titration is used, the figure being about five times higher with the latter than with the former. The virulence of dermovaccine by intracerebral titration is almost nil (no encephalitis produced), although inoculated animals were later proved to be immune to neurovaccine. A qualitative factor undoubtedly plays a part in the relation N.b./m.v.d. They propose to demonstrate the transition of a dermovaccine into an encephalitogenic strain under the influence of certain natural selective factors.

II. It was found that the number of testicular elementary bodies necessary to produce dermal lésions was much less than the number of bodies from the other two tissue sources of the virus (skin and brain), particularly when compared with the dermal virus. The bodies from the testicular source almost equalled in virulence those obtainable from allantoic membranes. The reasons for these variations will be explained later.—C. V. WATKINS.

- NAKAMURA, J., & IMAI, N. (1988). On the Infection of Fowl-Pest Virus "Strain Chiba" in Mice.—*J. Jap. Soc. vet. Sci.* **17**. 256-290 of pt. 1. 15 tables. [17 refs.] [In Japanese: abst. from English summary pp. 114-117 of pt. 2].

The authors were able to infect mice with fowl plague virus by intracerebral and intranasal inoculation, the former method yielding a higher percentage of infections. The brain, lungs and other organs from these animals subsequently proved infective for fowls and for the developing egg. The virus was passed through 18 serial passages in mice with no loss of infectivity for fowls. Serial passage through mice caused an elevation in virulence of the virus for these animals; the symptoms of the induced disease and the P.M. findings in mice are described.

The authors traced the path of a virulent mouse virus, and the organs in which it became progressively localized, by killing mice at varying periods of time after intravenous inoculation.—L. E. HUGHES.

- ANON. (1988). **Psittacosis Again**.—*Brit. med. J.* April 2nd. 787.

Sporadic cases of the disease continue to arise in Great Britain. Neither the human nor the bird population has been completely protected by regulations controlling the introduction of members of the parrot family. It is now known that the disease occurs in home-bred birds: the importation regulations overlooked

the possibility of entry of carriers among birds which passed through the quarantine period.

The periodic examination of the stock of pet shops is recommended, and also the education of the public to the fact that canaries and finches are susceptible and should not be kept in close association with human beings. The need in the future, perhaps, of safeguarding the health of visitors to zoological gardens is pointed out.—L. E. HUGHES.

KIDD, J. G. (1938). **Immunological Reactions with a Virus causing Papillomas in Rabbits. I. Demonstration of a Complement Fixation Reaction: Relation of Virus-Neutralizing and Complement-Binding Antibodies. II. Properties of the Complement-Binding Antigen Present in Extracts of the Growths: Its Relation to the Virus. III. Antigenicity and Pathogenicity of Extracts of the Growths of Wild and Domestic Species: General Discussion.**—*J. exp. Med.* 68. 703-724, 725-736 and 737-759. Numerous tables. [Numerous refs.]

I. Specific complement-fixation occurs with saline extracts of the virus-induced papillomas and the sera of rabbits bearing the growths. The sera of rabbits, which have borne large growths over long periods, fix complement in higher titre than the sera of others with small growths of shorter duration.

The sera of cottontail rabbits fixed complement and neutralized the virus in much higher titre than the sera of domestic rabbits with comparable growths. A further experiment showed that the production of complement-binding and virus-neutralizing properties of immune serum is stimulated by a specific antigen liberated from the virus-induced papillomas.

II. The complement-binding antigen was shown to be retained by filters in almost the same proportions as the virus. Heating at 56°C. and 60°C. had no noteworthy effect either on the virus or on the complement-binding antigen, whereas 68°C. and 69°C. rendered both inactive.

Ultraviolet rays could render papilloma extracts non-pathogenic without diminishing their capacity to bind complement. At pH levels of 1·8, 2·8 and 10·5 the pathogenicity and complement-binding capacity of the materials were abolished, while both remained unaltered at pH 4·4 and 9·0, as also at 6·6 and 6·8. At pH 9·8 the extracts had lost completely or almost completely their infectious properties, while retaining undiminished their capacity to bind complement.

III. Extracts which contained active virus in large amount bound complement very well, while those containing little or no virus fixed it poorly or not at all. Small, discrete, naturally occurring papillomas of cottontail rabbits usually furnished virus of high titre, while the larger confluent growths in highly susceptible cottontails yielded virus in moderate or small amounts or not at all. The sera of animals carrying large growths developed marked ability to neutralize the virus.

The papilloma virus gave rise to growths of exceptional vigour when inoculated into the skin of domestic rabbits, yet only rarely could it be recovered from them and then in an attenuated form. Crude suspensions of "non-infectious" papillomas from domestic and wild rabbits failed to bind complement under optimal conditions of test.—R. ISHERWOOD.

- I. BURNET, F. M., & FREEMAN, M. (1939). **Note on a Series of Laboratory Infections with the Rickettsia of "Q" Fever.**—*Med. J. Aust.* Jan. 7th. 11-12. 2 tables.

- II. SMITH, D. J. W., BROWN, H. E., & DERRICK, E. H. (1939). **A Further Series of Laboratory Infections with the Rickettsia of "Q" Fever.**—*Ibid.* 13-14.
- III. DERRICK, E. H. (1939). **Rickettsia Burneti: The Cause of "Q" Fever.**—*Ibid.* 14.
- I. A series of mild or sub-clinical laboratory infections of human beings with "Q" fever is described. Agglutinating and protective antibodies were demonstrated in the serum of those affected. The mite *Lyponyssus bacoti* is suspected of being the responsible vector, from experimentally infected mice. These cases occurred at Melbourne, where no natural cases of infection have been reported.
- II. Two laboratory infections occurred among the staff of the Queensland Health Department at Brisbane. It is suggested that the infection probably resulted from direct contact with infected mouse tissues. The authors consider that work with g. pigs provides little risk of accidental infection. G. pig inoculation failed to reveal the infectivity of *Liponyssus bursa* the tropical fowl mite which was present on the laboratory mice. The lice *Gliricola porcelli* and *Gyropus ovalis* parasitic on infected g. pigs similarly failed to produce infection.
- III. D., who first described "Q" fever and who has been active in subsequent research work, names the causal organism of this disease *Rickettsia burneti* after F. M. BURNET, the discoverer of the organism. A useful list of articles dealing with the clinical and bacteriological investigations up to the present time is given.—T. S. GREGORY.

## PARASITES IN RELATION TO DISEASE (GENERAL)

- I. HALL, M. C. (1939). **The Relation between Parasitic Diseases of Man and Animals.**—*Rep. 13th. int. vet. Congr. 1938.* 1. 646-652. [In English: French, German and Italian summaries. Discussion pp. 664-665 in German].
- II. KRAL, F. (1939). Die Beziehungen zwischen den parasitären Krankheiten des Menschen und der Tiere. [**The Relation Between Parasitic Diseases of Man and Animals**].—*Ibid.* 653-664. [Numerous refs.] [In German: English, French and Italian summaries. Discussion pp. 664-665 in German].
- I. H. discussed the relationship between parasitic diseases of man and animals generally. He made a plea for the recognition of the importance of this branch of epidemiology.
- II. The paper includes a comprehensive list of helminths, protozoa, insects and acari, and bacteria causing conditions common to man and animals. K. urges that the study of this subject should be further developed.—A. L. WILSON.
- GAMBLES, R. M. (1939). **A List of Parasites Recorded from the Domestic and Wild Animals and Birds of Cyprus.**—*Cyprus (agric.)* 34. 29-32.
- G. has compiled a list of approximately 140 protozoan, helminth and ectoparasites found in Cyprus. Apart from the usual domestic animals, other hosts mentioned are the fox, hedgehog, snake, rat, hare, rabbit, camel, pigeon and marsh harrier.—A. L. WILSON.

ROBERTSON, D. (1939). **Intestinal Parasites of Shetland Ponies in the North of Scotland.**—*Vet. Rec.* 51. 779-781. [4 refs.]

This paper is based on the results obtained at autopsy on four Shetland

ponies which had died as a result of infestation with intestinal parasites. Twenty-five species of nematodes and two species of cestodes were obtained and three of the ponies were infested with the larvae of *Gastrophilus intestinalis*. 925 specimens of *Anoplocephala perfoliata* were taken from one pony while another yielded 225 specimens. The other cestode was *Anoplocephala mamillana* of which 25 specimens were found. With the exception of *Trichostrongylus axei*, *Habronema microstoma*, *Ascaris equorum*, *Strongylus edentatus*, and *Strongylus vulgaris*, all the other parasites found belonged to the genera of the smaller strongyles. *Triodontophorus tenuicollis*, in particular, was found in large numbers in the right colon of all the ponies examined. The ponies were very emaciated and the wall of the caecum was three quarters of an inch thick in places.—A. L. WILSON.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

STEFANŃSKI, W. (1935). La distribution de l'hypoderme du boeuf en Pologne. [**Distribution of *Hypoderma bovis* in Poland**].—*XIIe Congr. int. Zool. Lisbonne, 1935*. 3. 2057-2060. [In French].

Results of enquiries into the distribution of ox warbles addressed to each veterinary surgeon in 225 districts, were as follows:—10% in 92 districts, 25% in 50 districts, 40% in 27 districts and 100% in 30 districts. Of 3,341 larvae collected, 2.3% were *Hypoderma lineata* and the remainder were *H. bovis*. The latter is apparently limited to the frontiers of Poland. The principle areas infested are the north-east, comprising seven districts, where *H. lineata* constitutes 18.4% of all the larvae, and the south, comprising three districts, where the percentage of *H. lineata* is ten.

ZOTTNER, G., & COSTE, E. (1939). L'hypodermose équine au Maroc. [***Hypoderma bovis* Infestation of Horses in Morocco**].—*Bull. Soc. Path. exot.* 32. 571-576.

Observations were made in Morocco on infestation of horses with larvae of *Hypoderma bovis*, the parasites having appeared on the withers, loins and back. The treatment adopted was, not to open the lesions, but to wait until the grubs could be removed by pressure. Infestation occurred in the winter, from November to March. Stallions at stud were never found to be affected, and it is suggested that the careful grooming of such stallions removes the eggs from the hair. It is suggested that as, owing to the limited range of flight of the adults, invasion from the outside is on a very small scale, this really eliminates the *H.b.* flies on the stud and explains why young horses are not affected until the time of sale. The parasites obtained were in most cases second stage larvae, but two sent in were identified as third stage larvae; a full account of the characters of the larvae is given. In view of this evidence, it is suggested that these larvae can grow to maturity in the horse.—R. P. HOBSON.

DOTEN, S. B., FLEMING, C. E., & VAWTER, L. R. (1938). **The Relation of Methods of Herding Sheep on the Open Range to the Prevalence of Grub in the Head (*Oestrus ovis*)**.—*Rep. Nev. agric. Exp. Sta.* 1936-37. p. 33.

Information obtained from Nevada in 1936 tends to confirm the idea that methods of herding affect profoundly the prevalence of this insect in range flocks. During the summer, losses and injuries due to this insect were at a minimum. This appeared to be due mainly to the fact that good range conditions made it unnecessary to concentrate the sheep close to watering places. The flocks were

widely scattered over the grazing territory, and the adult flies were usually remote from the sheep when they hatched from the soil.—R. P. HOBSON.

KNOWLTON, G. F., HARMSTON, F. C., & HARDY, D. E. (1988). **Blood-sucking Utah Diptera.**—*Proc. Utah Acad. Sci.* **15**. 108-105. [Copied *verbatim* from *Rev. appl. Ent.* **27**. 81].

Since mosquitoes have been found to be capable of transmitting equine encephalomyelitis from diseased to healthy animals under experimental conditions and since outbreaks of the disease have occurred in Utah in 1933-35 and 1937, it has been thought desirable to obtain information on the species and seasonal prevalence of blood-sucking insects. For this reason, a list is given of mosquitoes and other blood-sucking Diptera taken in all parts of the state during the last few years, showing the localities and dates of collection.

KING, W. V., & LENERT, L. G. (1936). **Outbreaks of *Stomoxys calcitrans* L. ("Dog Flies") along Florida's Northwest Coast.**—*Florida Ent.* **19**. 88-89. 8 figs. [Abst. from abst. in *Rev. appl. Ent.* **25**. 132].

Swarms of *Stomoxys calcitrans* appear along 200 miles of the coast of north-western Florida, at the end of August or beginning of September. Investigations showed that the fly was breeding in piles of *Sargassum* seaweed at the edge of a salt-water lake. The removal of piles of seaweed as they accumulate may be an effective method of controlling the fly.

I. REMLINGER, P., & BAILLY, J. (1988). Contribution à l'étude expérimentale des accidents déterminés par la tique du chien (*Rhipicephalus sanguineus*). [The Infectivity to the Dog Tick *R. sanguineus* of Material from Ticks Fed on Dogs Inoculated with Rabies Virus].—*Ann. Parasit. hum. comp.* **17**. 1-8. [1 ref.]

II. REMLINGER, P., & BAILLY, J. (1989). Développement possible du virus rabique dans l'organisme de la tique du chien (*Rhipicephalus sanguineus*). [Possible Development of Rabies Virus in the Dog Tick *R. sanguineus*].—*Ann. Inst. Pasteur.* **62**. 468-467.

I. It was found that ticks were present on dogs that had been inoculated with rabies fixed virus. Rabbits and g. pigs were inoculated with tick suspension prepared by grinding up ticks taken from these dogs. Out of 180 animals inoculated with the tick material, paralysis resulted in one rabbit; autopsy revealed no definite lesions that could account for death, and subinoculations were made into a normal rabbit which remained healthy. One rabbit and seven g. pigs of the above series of 180 died, but did not show symptoms of rabies.

II. One dog was inoculated with fixed virus, and another with street virus. Blood from engorged ticks collected from them was inoculated into two rabbits in the former case, and into four g. pigs in the latter. One rabbit died 48 days later, completely paralysed; numerous passages were made in which the inoculated animals developed the rabies syndrome and Negri bodies were detected. One g. pig succumbed to furious rabies 195 days later.—M. L. BINGHAM.

ELPAT'EVSKIY, V. S. (1988). **Observations on *R. sanguineus* in the Town of Baku.**—*Trud. Azerbajj. Fil. Akad. Nauk. (Sekt. Zool.)*. **7**. 127-130. 1 graph. [In Russian; German summary]. [Copied *verbatim* from abst. in *Rev. appl. Ent.* **26**. 197].

*Rhipicephalus sanguineus*, Latr., is abundant in summer on dogs in the town of Baku (Azerbaijan), and has also been taken on horses, cattle, sheep and goats.

It was the only tick found on a dog kept in the town from 24th February till the beginning of November and examined almost daily. The ticks appeared in March and disappeared in October, but were found on the dog throughout the intervening period. They showed two peaks of abundance, in May, when almost all of them were adults, and in July, when most of them were nymphs. Apparently, the nymphs hibernate and thus there is one generation a year; under room conditions those that dropped from the dog transformed into adults about the middle of January, but none did so in the autumn. In nature the last moult probably occurs in spring. No larvae were found either on the dog or in the field, and attempts to rear them from the eggs were unsuccessful. In nature, engorged females and nymphs occurred in the cracks in the stone steps leading to the house.

- (1936). El problema de la garrapata. [**The Tick Problem in Northern Argentine**].—*Rev. Med. vet., B. Aires.* 18. 617-621.

A proposed act prescribes zones of clearance, commencing with areas having natural boundaries, in which stock-owners would make returns of their farm stock and submit it to dipping at intervals of not less than 14 days during the season when the larvae are prevalent. Credits would be available to enable the larger ranches to erect their own dipping tanks.

A maximum sum of 4,500,000 dollars would be appropriated for the initial expense of permanent dipping stations [number not specified], 185 portable dipping tanks, 1,300,000 litres of free parasiticide, advertisement, and requisition of transport. Heavy penalties would be imposed for failure to comply with the proposed act.—J. PASFIELD.

- GUERRERO, R. P. (1938). Necesidad de una intensa campaña garrapaticida. [**Tick Control in Ecuador**].—*Rev. Cam. Agric. seg. Zona., Ecuador.* No. 5. pp. 31-35. 4 figs.

A note for stock owners concerning infection of cattle by *Babesia bigemina*, *Anaplasma marginale* and particularly "*Babesiella sudamericana*", the vector of which in Ecuador is *Boophilus annulatus*. The author's drastic suggestion is the employment of dipping in standardized arsenical dips, to every farm animal at intervals of 12 days throughout the year.—J. PASFIELD.

- MARTIN, R. (1938). Sur l'épilepsie parasitaire du cobaye. [**Epilepsy in G. Pigs Caused by Parasitism with Mallophaga**].—*Bull. Soc. Path. exot.* 31. 736-740. [16 refs.]

Three instances of outbreaks of epileptiform convulsions, involving in all 12 animals, are recorded among rearing stocks of g. pigs at Dire Daoua and Addis Ababa, Ethiopia. The affected g. pigs were in all cases heavily parasitized by the biting louse, *Gyropus gracilis*. In the less severely affected animals treatment of the infestation led to recovery.

Infested g. pigs inoculated intracerebrally with rabies virus also developed the convulsions. M. suggests that convulsions were a manifestation of the reflex epilepsy described by Brown-Sequard and were due to the large numbers of parasites on the skin.

M. remarks, however, that whereas convulsions due to ectoparasites can generally be attributed to the action of a toxic secretion, this cannot apply in the case of biting lice, which live on epithelial detritus, and do not pierce the skin.

—J. MACLEOD.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

- I. MATERNOWSKA, J. (1939). Der Versuch einer Analyse der Intrakutanreaktion (I.K.R.) bei Parasitenkrankheiten. [**The Intradermal Reaction in Parasitic Diseases**].—*Rep. 13th int. vet. Congr. 1938*. 1. 699-708. [In German: English, French and Italian summaries. Discussion pp. 717-719 in English, French and German].
- II. SCHOENAERS, F. (1939). Les réactions immunologiques dans les helminthiases intestinales. [**Immunological Reactions in Intestinal Helminthiases**].—*Ibid.* 709-717. 3 tables. [In French: English, German and Italian summaries. Discussion pp. 717-719 in English, French and German].

I. Three forms of intradermal reaction are recognized, (1) an early reaction which appears within 15-30 minutes and disappears in 5-8 hours; (2) a late reaction which begins after 6-8 hours, and (3) a biphasic reaction, the first phase of which reaches its maximum in 22-28 hours. The appearance of an early or late reaction is dependent on the species of parasite, and so parasites can be classified into two groups according to the character of the intradermal reactions they stimulate, the first containing the parasites which are strictly intestinal and with which the reaction is of the early type, and the second those which usually infest the tissues of the body, and which stimulate a delayed or biphasic action. Thus generally speaking an early reaction is seen in ascariasis, trichocephalosis, enterobiasis, ankylostomiasis, strongylosis and various cestode infestations. The type of the reaction is influenced by several factors, including the type of parasite, the time elapsing since the invasion by the parasite, and repetition of the reaction itself on the same patient. The reaction appears as a group manifestation in parasitic infestations that are strictly intestinal, while it is more specific in infestations where the parasites live in the tissues. In intestinal parasitism the reaction may occur after the parasites have disappeared from the body of the host.

II. S. carried out c.f. tests for specific antibodies in the serum of hens infested by *Ascaridia galli* and *Heterakis gallinae*. Reactions for either parasite were not well defined and not specific. Uninfested animals gave positive reactions. S. considers that his tests indicate that the two parasites are closely related immunologically.

He states that so far as richness of the serum in antibodies is concerned parasitic diseases can be graded in descending order as follows:—diseases of the blood and tissues, intestinal diseases in which the parasites migrate through the tissues, and diseases in which the parasites live on the intestinal mucosa or on the external skin.—A. L. WILSON.

EMMEL, M. W. (1939). **Sulfured Soil for Poultry Yards**.—*J. Amer. vet. med. Ass.* 94. 409-410. [2 refs.]

Experiments have been conducted at the Florida Agricultural Experiment Station in connexion with poultry raising.

Commercial flowers of sulphur scattered over the soil at the rate of 800 lbs. per acre (1.9 lbs. of sulphur per 10 sq. ft.) has been found useful in the control of parasitic diseases in cases where birds have to be confined in the same yards continuously. The action of soil bacteria on sulphur may eventually produce sulphuric acid, and lead to an acid reaction of the soil.

Only one application a year is necessary. The increased acidity of soil treated with sulphur causes the disappearance of intermediate hosts of poultry tapeworms and roundworms.

AFRICA, C. M., & DE LEON, W. (1938). **Observations on the Mechanism of Phagocytosis of Various Helminth Ova.**—*Livro Jubilar Prof. L. Travassos*. pp. 1-9. 20 figs. on 5 plates. [10 refs.] Rio de Janeiro : Instituto Oswaldo Cruz. [In English].

Experiments were made with a view to finding a new and better method of studying phagocytosis of foreign objects in the tissues.

Fertilized unincubated eggs of *Ascaris lumbricoides* placed in the mesentery and omentum of monkeys can develop there as if they were in a culture medium. Twenty-six days after intraperitoneal inoculation many eggs were embryonated ; others were less developed. The presence of these eggs attracts numerous giant cells which cause a tissue reaction.

No embryonal development was observed in any *Fasciola gigantica* eggs found in experimentally produced nodules, and degeneration of the contents of all eggs which had escaped destruction was noted.

In the case of *Schistosoma japonicum* the giant cells attack the eggs by anchoring themselves to the periphery and surrounding them with cytoplasmic projections.

The authors had observed that giant cells do not appear to attack heterophyid eggs, so they inoculated washed eggs into the peritoneal cavity of a monkey. Tiny nodules were recovered from the omentum when the monkey was killed two weeks later, but not a single giant cell was found.

HERBER, E. C. (1938). **Schistosoma Dermatitis in Dogs.**—*J. Parasit.* **24**. 474-475. 1 fig.

An attempt was made to infect a 14-day-old mongrel with cercariae of *Schistosoma douthii*. The puppy's abdomen was wetted for 20 minutes with water containing cercariae ; a rash appeared in 45 minutes and disappeared four days afterwards. [No further observations on this dog are reported].

CAWSTON, F. G. (1938). **Favourite Sites of Schistosomes and a Consideration of their Destruction in Stock.**—*J. trop. Med. (Hyg.)*. **41**. 293-294. [6 refs.]

Schistosomiasis in stock is often difficult to detect. Cattle do not suffer from haematuria like infected persons ; instead they harbour the parasites in the nasal cavities, though not showing marked symptoms.

The treatment of stock affected with schistosomiasis is difficult. Slaughtering affected cattle would probably be a better control measure than attempting any cure, which might be only partly successful.—D. D. OGILVIE.

STENGEL. (1938). **Verbreitung und Bekämpfung der Rinderfinne. [Incidence and Control of Bovine Cysticercosis].**—*Berl. Münch. tierärztl. Wschr.* Nov. 11th. 692-695.

In Germany the number of detected cases of cysticercosis rose from 6,823 in 1925 to 18,532 in 1935. The figures include swine cysticercosis, but since the number of cases of the latter was only 1% of the total they may be regarded as of minor importance. It is estimated that *Taenia saginata* causes a total annual loss of two million gold marks, and it is suggested that the increase of cases may be due to an increased use of meat and "delikatessen" prepared from uncooked meat. As a means of controlling bovine cysticercosis a bonus of five marks is recommended to the lay meat inspector for every infested carcass he detects. At the present moment experiments are proceeding with a view to killing the cysts by means of electricity.—A. L. WILSON.

HARWOOD, P. D. (1988). **Reproductive Cycles of *Raillietina cesticillus* of the Fowl.**—*Livro Jubilar Prof. L. Travassos*. pp. 218-220. [11 refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

H. carried out experiments on the rate of shedding of strobilae by tapeworms. *R. cesticillus* was fed to laboratory-raised chickens, in one of which infestation was observed for over 18 months. At the beginning of a cycle the segments were large and numerous, and well filled with eggs; the segments gradually became smaller, contained fewer eggs, and a few sterile segments were excreted. The decline in segment elimination was not regular but was marked by periods in which no segments or only relatively few, were eliminated. Chains of unripe proglottides followed, and for a time few or no segments were excreted. This period of diminished excretion was often of very short duration, but sometimes lasted several weeks.

INGLEZ, A. (1937). Nota sobre o ciclo evolutivo dos céstodos do género "Moniezia". [**Development Cycle of *Moniezia***].—*Rev. Med. vet., Lisboa*. **32**. 134-140.

The author tested KONSULOFF's theory [(1929). *Ann. Parasit. hum. comp.* **7**. 477.] that the transmission of *Moniezia* is by a form (named by K. a "lactocyst") via the maternal milk of ewes. 3 c.c. of a suspension of *Moniezia* ova were fed daily for 60 days to two lactating ewes pastured under optimal conditions. Milk samples were taken six hours after the first administration, then daily for 15 days, and then at four-day intervals. Although Konsuloff's technique was rigidly followed, on no occasion was any body resembling a lactocyst observed.—J. P.

- I. DE WAELE, A., & DE COOMAN, E. (1938). Étude expérimentale de l'échinococcose secondaire. [**Experimental Secondary Echinococcosis**].—*Ann. Parasit. hum. comp.* **16**. 121-132. 7 tables. [15 refs.] [Also appeared in *Vlaam. Diergeneesk. Tijdschr.* **7**. 215-221].
- II. COUTELEN, F., LECROART, D., & COCHET, G. (1939). Sur la réceptivité de la souris blanche à l'échinococcose secondaire expérimentale, par inoculation intra-péritonéale de sable hydatique d'hydatides échinococciques du cheval. [**Susceptibility of White Mice to Secondary Experimental Echinococcosis by Intraperitoneal Inoculation of "Hydatid Sand" from Horses**].—*Ibid.* **17**. 4-11. 4 figs. on 2 plates, 1 table. [7 refs.]
- III. COUTELEN, F., CALLOT, J., & DESPORTES, C. (1939). Réceptivité de l'écureuil (*Sciurus vulgaris*) et du ragondin (*Myocaster coypus*) à l'échinococcose secondaire expérimentale. [**Susceptibility of the Squirrel (*S. vulgaris*) and of the Coypu (*M. coypus*) to Secondary Experimental Echinococcosis**].—*Ibid.* 162-166. 3 figs. on 1 plate. [11 refs.]

I. This paper records the results of the inoculation of hydatid scolices, originally obtained from a horse, into numerous laboratory animals by various routes. The method of preparation of the inoculum is described. The highest percentage of infections was obtained in white mice, when injected intraperitoneally and subcutaneously.

II. The susceptibility of white mice to intraperitoneal inoculation of equine "hydatid sand" was found to be 64.7%. The development and characters of daughter cysts depended not only on the amount of the inoculum and the duration of the experiment, but also on individual variations for each animal. One positive reactor survived for 568 days, whilst another, which died 302 days after inoculation, exhibited an enormously distended abdomen due to multiple daughter cysts of variable size, all of which were sterile.

III. Nine rodents were injected with 0.5 c.c. of "hydatid sand" (containing about 200,000 scolices). P.M. examination later revealed cyst formation in three of them, a squirrel and two coypus. In the latter, the adventitious capsule was extremely thin. Such animals may maintain echinococcosis in countries where the disease is endemic.—M. L. BINGHAM.

SAWITZ, W. (1938). *Echinococcus Infection in Louisiana*.—*J. Parasit.* **24**. 487-489. [7 refs.]

This is a summary of reports on hydatid disease in the United States, mainly as it affects human beings. The number of human cases known to date is 391. The rarity of the condition in human beings in the United States suggests that echinococcus is also rare in dogs.

NAKATA, K. (1936). *On the Development of the Embryos of Ascaris lumbricoides in the Egg Shell*.—*J. Chosen med. Ass.* **26**. 509-520 of pt. 1. 16 figs. on 2 plates, 1 table. [Numerous refs.] [In Japanese: English summary p. 28 of pt. 2]. [Copied *verbatim* from *Helminth. Abstr.* **5**. 85. Signed R. T. L.]

Embryonated *Ascaris lumbricoides* eggs are only infective after the appearance of motile embryos which have moulted once in the shell. In mice lung invasion occurs only after eggs have been cultured for 35 days. The infective larvae are characterized by the appearance of the excretory organ and moulting in the region of the head together with the disappearance of the winding of the oesophageal lumen.

WETZEL, R., & ENIGK, K. (1938). *Die Entwicklungsdauer des Pferdespulwurmes (Parascaris equorum) im Esel*. [*Life Cycle of P. equorum in Donkeys*].—*Dtsch. tierärztl. Wschr.* **46**. 806-807. [Numerous refs.]

The authors infected experimentally a donkey foal on the first and second day after weaning with 100 ascarid eggs each day. On the second day there was a slight increase of body temperature, lasting three days. Between the 10th and 18th day coughing was observed, and inappetence was apparent for three weeks. Faecal examination, performed twice daily beginning with the 4th week, and daily from the 7th week, revealed eggs from the 81st day; their number increased very rapidly for 9 days and remained constant for about 100 days.

—V. CHLÁDEK (PRAGUE).

OLAFSSON, A. (1939). *Findet fortlaufend eine Ausscheidung von Spulwurm- und Lungenwurmeiern im Kot statt?* [*Excretion of Eggs of Ascaris and Lung-worms in Faeces*].—*Dtsch. Peltztierz.* **14**. 198-199.

O. investigated the excretion of eggs in fur foxes from the middle of December till the middle of January. Faecal examination showed that *Ascaris* eggs were found in only 20% of the infested animals although the parasites were found in the foxes. In lungworm infestations 40% of the infested animals showed no eggs in the faeces.—A. L. WILSON.

FOSTER, A. O., & ORTIZ, P. O. (1937). *A Further Report on the Parasites of a Selected Group of Equines in Panama*.—*J. Parasit.* **23**. 360-364. 2 tables, 1 graph. [2 refs.]

This is a continuation of a study already abstracted [see *V. B.* **7**. 396, and **8**. 878]. A special study was made of strongyle parasites. In a total of 97 horses examined, strongyles belonging to 12 genera and 84 species were identified. A table shows the number of horses infected with each species, and the sites of infestation in their intestine.

WETZEL, R., & ENIGK, K. (1988). Wandern die Larven der Palisadenwürmer (*Strongylus* spec.) der Pferde durch die Lungen? [**Do Horse Strongyle Larvae Pass through the Lungs?**]*—Arch. wiss. prakt. Tierheilk.* **73**. 88-93. 2 figs. [Numerous refs.]

Larvae of unnamed horse strongyles, given *per os* to mice, g. pigs and rabbits, developed in the small intestine; only a few larvae entered the wall of the large intestine. Their further behaviour showed no regularity. Among mice and g. pigs no formation of nodules in the intestinal wall occurred. There is no evidence that the larvae ingested by solipeds pass through the liver, vena cava, lymphatic stream, the right heart, the lungs, the trachea or pharynx. Repeated tracheotomies and oesophagotomies of infected solipeds in order to detect the presence of the larvae remained without effect during the whole observation period of 98 days.—V. CHLÁDEK (PRAGUE).

DIKMANS, G. (1986). **A Note on *Dictyocaulus* from Domestic and Wild Ruminants.** —*J. Wash. Acad. Sci.* **26**. No. 7. 298-303. 1 fig., 1 table. [4 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **76**. 64].

The author is unable to find definite morphological characters to separate the females of *D. hadweni* Chapin 1925 and *D. viviparus* (Bloch 1782) Raill. & Henry 1907, and it is concluded that *D. hadweni* must fall into synonymy. It is pointed out that only carefully controlled feeding experiments could establish whether there are biological varieties capable of infecting only cattle or only deer, or whether these nematodes are biologically as well as morphologically identical.

WHITLOCK, S. C. (1987). **An Apparent Case of Sexual Difference in Resistance to Parasitic Infection.**—*J. Parasit.* **23**. 426.

Of 34 cases of *Syngamus trachea* infestation found P.M. in Hungarian partridges (*Perdix perdix perdix*) confined in pairs in breeding pens, 32 were female birds, and only two were males. The chances of infestation were, as far as is known, equal. W. suggests that the greater incidence of infestation in the females might have been due to lowered resistance caused by egg-production.

ALICATA, J. E. (1938). **The Life History of the Gizzard-Worm (*Cheliospirura hamulosa*) and its Mode of Transmission to Chickens, with Special Reference to Hawaiian Conditions.**—*Livro Jubilar Prof. L. Travassos*. pp. 11-20. 1 text fig., 5 plates, 3 tables. [5 refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

The extent of gizzard-worm infestation in birds in various poultry farms in Hawaii is described. Experiments showed that grasshoppers under natural conditions harbour infective larvae of the parasite, and sandhoppers, weevils and beetles may serve as carriers.

Control measures suggested include the keeping down of weeds in poultry yards and removal of droppings. A. found that small amounts of copper sulphate would kill sandhoppers. A 1 c.c. dose of carbon tetrachloride did not cure six infested chickens. No drugs are thus far known which will affect these parasites *in situ* in the tissues.

CHAKRAVARTY, G. K. (1986). ***Dirofilaria indica* n. sp. from the Heart of a Dog.** —*Z. Parasitenk.* **9**. 57-60. 2 figs., 1 table. [19 refs.] [In English].

This is a detailed description of male and female *dirofilaria* obtained from the heart of a dog in Calcutta. The worms were compared with specimens of *D. immitis*, *D. magalhaesi*, and *D. pongoi*, and as differences were found they were named *D. indica*.

WITENBERG, G. (1938). **Studies on Acanthocephala. 3. Genus *Oncicola*.**—*Livro Jubilar Prof. L. Travassos*. pp. 537-560. 25 figs. [18 refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

W. gives detailed descriptions of species of *Oncicola*, of which only *O. canis* is of veterinary interest. Descriptions are given of 3 specimens of *O.c.* from the U.S. National Museum, from a dog, a coyote and a turkey.

*O.c.* resembles *O. onicola*, but may be distinguished from it by the cylindrical (not ring-shaped) collar, and its smaller hooks.

## IMMUNITY

CABOT, D. A. E. (1938). **The Double Intra-dermal Tuberculin Test. Delayed Positive Reactions.**—*Vet. Rec.* 50. 1233-1234.

The delayed positive reaction is described as a response to the double intra-dermal tuberculin test at the 4th or 5th day in animals which were negative at the 72nd hour. Under the Attested Herds Scheme, 318 herds tested for the first time were examined at the 72nd, 96th and 120th hours respectively. In 33 herds, comprising 655 animals, there were no reactors, while in 285 herds embracing 16,119 animals, 5,791 reacted. At the 72nd hour 11,563 were negative, 4,856 were positive, and 300 were doubtful, but at the 120th hour an additional 935 had become positive, representing 16% of the total number of reactors.

These phenomena appear to be restricted to herds tested for the first time, since 41 herds presented for attestation and tested at least twice previously showed only one delayed reactor after the 72nd hour. It is proposed, therefore, that for the tuberculin survey which embraces herds tested for the first time, the readings at the 72nd hour shall be omitted and replaced by a visit at the 96th hour.—R. E. G.

- I. SMYTHE, R. H. (1939). **Tuberculin Testing: Some Notes on the Identification of Cattle.**—*Vet. Rec.* 51. 533.
- II. BLANCHARD, W. D. (1939). **Improvements in the Technique of Tuberculin Testing.**—*Ibid.* 236-238. [3 figs.]
- III. BLANCHARD, W. D. (1939). **Further Observations on the Technique of Tuberculin Testing in the Field.**—*Ibid.* 534-535. 1 table.
- IV. HANCOCK, R. C. G. (1939). **The Elimination of Some Variable Factors from the Intradermal Tuberculin Test.**—*Ibid.* 17-19. [4 figs.]

I. Identification difficulties in cattle are discussed. S. describes a method for temporary identification of cattle under test. A numbered disc is attached around the base of the horns by means of wire or cord secured with a marked lead seal; polled cattle have sealed cord or wire placed around the neck close to the head. The certificate of test gives ear marks, description of animal (with a map of colour markings) and details of markings on the seal. It is valid only whilst the sealed cord is intact.

II. An improvised "crush" for restraining cattle under test is described. It consists of two gates, placed parallel at a distance of 20 inches, and opening in opposite directions. A modification for use under cover is also described.

B. injects tuberculin with a dental syringe, the needle of which protrudes through a lead disc which governs the depth of the injection and permits speedy and easy use. He also uses calipers fitted with a dial which facilitates the reading of measurements.

III. B. injected pieces of skin with coloured spirit and with a mixture of coloured spirit and liquid paraffin to test depth and character of injections. He

now uses in place of the lead disc a brass ferrule on the syringe, with a piece of cork through which the needle protrudes.

IV. H. describes various ways in which the skin may be measured and the variations in the recorded measurements which follow. He recommends the use of calipers fitted with cylinder ends in place of ball points, and having on the rule a sliding block (controlled by a spring) which allows readings to be taken after the calipers are removed from the fold of skin. He considers that syringes and needles used for testing cattle should conform to a specified standard.—H. E. BYWATER.

**BUXTON, J. B., & GLOVER, R. E. (1989). Tuberculin Tests in Cattle. Observations on the Intradermal Tuberculin Test in Cattle with Special Reference to the Use of Synthetic Medium Tuberculin.—Rep. Ser. Agric. Res. Coun. Lond. No. 4. pp. v+94. 11 tables, 14 charts, 2 appendixes. [Numerous refs.] [1s. 6d.]**

The report opens with a general review of the application of the double intradermal test to cattle in Great Britain during the past 15 years. The improvements effected by the replacement of O.T. by synthetic medium tuberculin are described, and reasons are advanced for the selection of precipitation by ammonium sulphate for the concentration and purification of the active principle. Details are given of experiments in allergic cattle on local sensitization and desensitization which indicated that in highly sensitive animals the injection of non-specific suspensions, e.g. glycerin veal broth, near the site of a tuberculin reaction might induce pseudo-positive swellings. In addition to this sensitivity to non-specific products, the changes which took place in the tissues immediately adjacent to an intradermal inoculation of tuberculin were studied. It is pointed out that

" . . . in strongly allergic animals, well defined areas of increased sensitivity with a radius of two to three inches developed around the site of the original tests and lasted for a period which extended from the fifty-eighth hour up to the end of the second week. During the third and fourth weeks, however, these same areas underwent a change in the opposite direction and, in the majority of animals, became definitely less allergic, the reactions to the test dose being less marked than in other parts of the skin. Full sensitivity was regained at about the sixth week ".

Attempts to dope animals to the double intradermal test by repeated intradermal or subcutaneous injections of tuberculin were unsuccessful. It was clearly shown that unheated tuberculin protein possessed definite sensitizing potentialities and was capable, after three or four preliminary injections, of inducing reactions of a positive nature. Tuberculins which had been heated were not capable of producing this effect. It is suggested, therefore, that undenatured tuberculin should not be used for the systematic testing of cattle.

An attempt was made to sensitize normal cattle by the injection of various organisms which might induce a tuberculin sensitivity. Negative results were obtained with *Corynebacterium pseudotuberculosis*, *Actinomyces bovis*, *Actinobacillus* and *Mycobacterium phlei*.

Different results were obtained, however, with *Mycobact. tuberculosis avium* and *Mycobact. johnei*. It was found that

" during the first few weeks following infection, the animals were not only highly allergic to johnin and to avian tuberculin, but also gave definite reactions to mammalian tuberculin. It was evident, therefore, that some degree of cross reaction was to be expected during the period of maximum sensitivity. As the allergic response declined, however, the skin response to the mammalian product decreased in intensity and eventually the beasts became completely negative, while the reactions to the avian tuberculin and the johnins persisted until the termination of the experiment ".

Four calves were fed with cultures of the avian tubercle bacillus. P.M. three were free from infection, but one showed slight lesions. Transient reactions

to tuberculin were noted in the lesion-free animals, but clear-cut reactions to both avian and bovine tuberculins occurred in the fourth.—R. E. GLOVER.

TOBLER, J. (1937). Ueber die intrakutane Tuberkulinprobe beim Rinde. [**Intra-dermal Tuberculin Tests in Cattle**].—*Inaug. Diss., Hanover*. pp. 40. 6 figs. [Numerous refs.]

T. gives a good account, with illustrations, of the technique of the single intradermal tuberculin test, showing two types of caliper which record the measurement on a circular dial.

85 cattle were tested simultaneously with Dorset's tuberculin and with a German proprietary product, "Landesberger" tuberculin. Both kinds gave a positive reaction in simultaneous tests on 20 animals, an increase in 4 mm. of skin thickness being regarded as positive. 140 other cattle were similarly tested with "Landesberger" tuberculin and with another German product, "Perleberger" tuberculin. There were 67 positive reactions to the former and 61 to the latter. [No P.M. verifications in either of the above tests]. The necessity for standardizing tuberculin is stressed.

Finally 50 cattle were tuberculin tested, either with the American tuberculin or with both German tuberculins, and examined P.M.; the findings agreed fairly closely and the few discrepancies are discussed.—J. E.

NEHM, M. (1937). Ueber die Agglutination des *Streptococcus agalactiae*. [**Agglutination of *Streptococcus agalactiae***].—*Inaug. Diss., Hanover*. pp. 35. 6 tables. [Numerous refs.]

The agglutination test was used to examine the blood and milk from healthy and infected cows. In all 61 blood sera and 127 milk samples were examined. The titres varied from 0 to 2,000 in blood and from 0 to 200 in milk, there being no definite difference between the infected and the non-infected cows. There seemed, however, to be a significant difference in the titres of milk from infected and free quarters of the same cow. The infected quarters (19 examined) gave titres between 20 and 200, whereas in the free quarters (9 examined), the titres were all under 20.—P. S. WATTS.

HOSSENFELDER, F. (1937). Eignet sich die Blutserumpräzipitation für die Galt-diagnose beim Rind? [**Diagnosis of Mastitis in Cattle by the Precipitation Test**].—*Inaug. Diss., Munich*. pp. 26. [18 refs.]

Extracts of 19 cultures of freshly recovered *Streptococcus agalactiae* were prepared by one of three methods:—(1) shaking, (2) saline extraction and (3) antiformin. When these extracts were tested for precipitation with two normal sera from cattle, three from horses and seven from known infected cows, many gave positive results with the negative sera and others negative results with the positive sera. It is therefore concluded that this method is not suitable for diagnosis.—P. S. WATTS.

MEYER, D. B., & HUDDLESON, I. F. (1938). The Relation Between the Presence of *Brucella Abortus* and Agglutinins in Milk in Cattle Showing a Blood Agglutination Titer of 1-200 or Higher.—*Cornell Vet.* 28. 293-295. [Authors' summary copied *verbatim*].

In the majority of the animals studied *Br. abortus* appears in the milk before agglutinins are detected in the milk.

*Br. abortus* may be present in the udder for a long period without the presence of agglutinins,

*Br. abortus* and agglutinins may occasionally be present in the udder in the absence of agglutinins in the blood.

Approximately 12 per cent. of animals showing agglutinins in the milk in a titer of 1-100 or higher and positive milk culture become negative to the former or the latter or to both.

These data show that often times there is little, if any, correlation between the presence of *Brucella* in the milk and the presence of agglutinins in the milk.

PENNELL, R. B., & HUDDLESON, I. F. (1938). **Quantitative Studies of *Brucella* Precipitin Systems. I. Precipitation of Homologous Antisera by *Brucella* Endoantigens. II. The Precipitation of Heterologous Antisera by *Brucella* Endoantigens.**—*J. exp. Med.* **69**. 73-81 and 88-93. 4 figs., 12 tables. [Numerous refs.]

These two papers are not easy to abstract because they are based on previous quantitative studies [see HEIDELBERGER and KENDALL (1937). *J. exp. Med.* **65**. 647, and earlier articles] to which reference must be made for a complete understanding of the formulae involved.

In the first paper the authors claim that precipitation of homologous antibody by purified brucella antigens over a range of increasing antigen and constant antibody can be described by the formula :—

$$\text{antibody nitrogen precipitated} = 2RS - \frac{R^2S^2}{A}$$

where R = the ratio of antibody N to antigen N at the equivalence point, S = the amount of antigen N added, and A = the antibody N at the equivalence point. Briefly, this formula shows that the amount of antibody precipitated is increased by increasing amounts of antigen, but that this relation is not linear; the ratio of precipitated antibody to antigen in fact decreases as the amount of antigen increases.

In the second paper the authors show that when brucella sera are precipitated by heterologous brucella antigens the resulting amounts of precipitated antibody do not follow the above equation. This confirms the fact that the three antigens are serologically distinguishable.—F. W. PRIESTLEY.

SUGAI, T. (1936). **Studies on the Sero-Diagnosis of Tuberculosis by the Complement Fixation Reaction. III. Concerning the Results of the Complement Fixation Reaction with our Improved Antigen done for the Sera of the Various Forms of Tuberculosis, Syphilis and Leprosy and the Special Reference to the Reaction and the Process of Tuberculosis.**—*Jap. J. exp. Med.* **14**. 881-885. 9 tables. [In English].

Using an antigen consisting of purified tuberculin to which lecithin had been added [*V. B.* **7**. 399.], S. carried out c.f. tests on 552 human cases of pulmonary TB., obtaining a positive result in 71% of cases as verified P.M. The intensity of the reaction increased with the severity of the lung damage and with the heaviness of the bacterial infection. There were positive reactions with 2.7% of 358 samples of serum from normal persons, in 2 out of 64 cases of syphilis and in 20 out of 22 cases of leprosy.—J. E.

KARLSON, A. G., & McNUTT, S. H. (1939). **A Microscopic Agglutination Test for the Diagnosis of Swine Erysipelas.**—*J. infect. Dis.* **64**. 49-51. [5 refs.]

A brief review of the available literature is given. The preparation of a special liquid medium is described; smooth, young cultures are used in preparation of antigen. Dilutions of sera with culture are made in watch glasses; hanging drops are incubated fifteen minutes and then examined under a low power objective.

Several hundred sera were tested. Artificially infected rabbits reacted up to 1:6,400. Swine with chronic erysipelas gave titres of 200 to 400. A similar antigen gave negative results in acute outbreaks.

Better results were obtained with the microscopic than with the tube test.  
—F. H. MANLEY.

NUMATA, G. (1938). **Complement Fixation Reaction in Weil's Disease. Mainly on the Improvement of the Antigen.**—*Kitasato Arch.* 15. 45-66. 16 tables. [6 refs.] [In English].

N. describes an antigen for the c.f. test in Weil's disease. Complement fixation could be obtained with sera from cases of Weil's disease using resuspended deposits of *Leptospira icterohaemorrhagiae* cultures. The sensitivity of this antigen was improved by the addition of tincture of guaiacum. An antigen prepared from the spirochaetes after the removal of protein was equally efficient. Sera from cases of Weil's disease gave a group reaction with *L. autumnalis*.—D. L. HUGHES.

DONATIEN, A., & LESTOQUARD, F. (1939). Vaccinations simultanées par le vaccin antibactérien G.A. et la vaccin antisymptomatique. [**Simultaneous Vaccination with Anthrax G.A. "Vaccine" and with Blackleg Vaccine**].—*Arch. Inst. Pasteur Algér.* 17. 192-193.

Twenty-seven cattle of French breed and three native ones between one and three years old were inoculated simultaneously with 0.5 c.c. of anthrax "G.A. vaccine" on one shoulder and Leclainche blackleg vaccine on the other. Neither local nor general reaction followed nor was there an activation of the piroplasmiasis of which many were carriers.—G. WILLIAMSON.

ORSKOV, J. (1938). **Experimental Studies on the Sites of Antibody Formation.**—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 137-142. 1 table. [In English].

It has not been easy to demonstrate differences in the amount of antibody present in different tissues and organs compared to that present in the blood.

The author observed that the antibody of vaccinia virus is present in rabbits at the site of inoculation in the skin in greater concentration than in the blood. The actual source of the antibody was not determined. The same thing occurred when the rabbits were inoculated intra-testicularly. It is considered that antibody formation is associated with the reticulo-endothelial cells.

It is possible that the difficulty of demonstrating local antibody formation with bacterial antigens is due to the close combination of the antibodies with the antigens.—F. H. MANLEY.

GREENWOOD, M., HILL, A. B., TOPLEY, W. W. C., & WILSON, Joyce. (1939). **The Effect of Withdrawing Mice from an Infected Herd at Varying Intervals.**—*J. Hyg., Camb.* 39. 109-130. 1 fig., 8 tables. [9 refs.]

Batches of 60 mice were added at weekly intervals to a mouse herd infected with *Salmonella typhi-murium*, and a proportion of the added mice removed and isolated after exposures of 7, 14, 21, 28 and 35 days in the infected herd. The disease in the herd differed from previous results in herds to which small numbers of new individuals had been added at a time, in that during the earlier days of cage age, the mortality was not so high, but the level of mortality was maintained to a cage age of at least 70 days, instead of the rapid fall consistently observed in herds to which small continuous additions are made. The infection rate in mice withdrawn from the herd after 7 days' exposure is estimated at 34 %, and after 14,

21, 28 and 35 days at 56%, 65%, 69% and 79% respectively. The change of environment from herd life to isolation in single cages was found to have a detrimental effect, but in spite of this, comparison of the mortality amongst withdrawn mice with that of animals remaining in the herd showed that withdrawal was advantageous at any period up to 35 days, the earlier the withdrawal the greater being the benefit. The results also confirm the previous findings that the rate of infection in a herd cannot be accounted for by any law based on a constant average risk of infection throughout life. It appears that there must be some factor which renders mice less susceptible to a change from the uninfected to the infected state as cage age advances.—U. F. RICHARDSON.

### DISEASES, GENERAL

- I. HAUPT, H. (1938). Die Rinderställe und die Verbreitung von Tuberkulose, seuchenhaftem Verkalben und gelbem Galt unter den Rindern eines sächsischen Dorfes. [**The Effect of the Type of Cattle Byre on the Spread of Tuberculosis, Contagious Abortion and Mastitis**].—*Z. InfektKr. Haustiere*. 53. 49-51.
- II. KÖTZSCHKE, J., WAUER, H., STEGER, G., & KRENKEI, K. (1938). Die Rinderställe. [**Cow Byres**].—*Ibid.* 51-61.
- III. SCHULZE, H., zu BARGHOLZ, M., MINCK, & SCHÄFER, R. (1938). Die Tuberkulose. [**Tuberculosis**].—*Ibid.* 61-64.
- IV. MODES, E., HILL, W., LUCHMANN, H., & BOSSE, W. (1938). Das seuchenhafte Verkalben. [**Bovine Contagious Abortion**].—*Ibid.* 64-66.
- V. WEHSE, E., GROSSE, G., & WIEGAND, H. (1938). Der gelbe Galt. [**Streptococcal Mastitis**].—*Ibid.* 66-68.
- VI. WAUER, H. (1938). Zusammenfassung der Seuchenuntersuchung. [**Summary of Articles I-V**].—*Ibid.* 68-72. 1 table.

A series of brief addresses aimed at stressing the importance of hygiene and, in particular, properly planned byres, in the control of contagious disease. Cow byre planning is discussed and it is stressed that in judging the suitability or otherwise of a byre, attention must be paid to adequate ventilation and drainage, the certainty that food cannot be contaminated with excreta, roominess of all gangways and the provision of efficient quarantine boxes and calf pens.

The high incidence of bovine tuberculosis, contagious abortion and mastitis and the heavy economic losses caused by these infections is stressed. It is pointed out that on many farms eradication of these diseases is rendered impossible because adequate stabling accommodation is not available.—E. J. PULLINGER.

- MIÈGEVILLE, J., & ZOTTNER, G. (1939). Lupinisme et piroplasmose au Maroc. [**Lupinism and Piroplasmosis in Morocco**].—*Bull. Acad. vét. Fr.* 12. 161-168. [Also appeared in *Maroc méd.* 19. 194].

The authors discuss the differential diagnosis of piroplasmosis and lupin poisoning.—N. J. SCORGIE.

- GUERRERO, R. P. (1938). Enfermedades de los cerdos. [**Pig Diseases**].—*Rev. Cam. Agric. seg. Zona., Ecuador*. 1. No. 9. 53-56. 2 figs.

G. speaks of the heavy parasitic infestation among pigs in the littoral belt of Ecuador, but apart from verminous bronchitis these conditions are not specified. There is a high mortality rate from swine fever and from haemorrhagic septicaemia. Pig paratyphoid occurs but is not prevalent. The usual prophylactic and curative inoculations are employed.—J. PASFIELD.

- (1989). **Report of the Special Committee on Poultry Diseases.** [Amer. Vet. Med. Ass.]—*J. Amer. vet. med. Ass.* **94.** 311-318.

The committee stresses the chaotic methods and varied personnel dealing with poultry diseases in U.S.A. It recommends the formation of a special committee to study this problem and, especially, what responsibility the veterinary profession should undertake. It emphasizes that live poultry should be inspected by veterinarians under the Bureau of Agricultural Economics' scheme, and also recommends an amendment of the Meat Inspection Act so as to include poultry.

In view of continuing outbreaks of infection with *Erysipelothrix rhusiopathiae* (the bacillus of swine erysipelas) which have occurred in turkeys since 1985 and its spread to several states, an attempt to determine the source of infection (sheep and fish-meal are suspected) is advised. The geographic and host distribution of poultry parasites, including blood parasites, require investigation. Because wild birds may act as reservoirs of infection for common poultry, examinations of all species of birds, especially game birds, are recommended in order to acquire all the information possible. The importance of correct differential diagnosis of tumours histologically and by transmission tests is stressed, and the standardization of examination methods for the diagnosis of respiratory diseases is advised.

General criticism of the United States National Poultry Improvement Plan is directed chiefly against certain provisions relating to control of *Salmonella pullorum* infection, such as, (a) if only 10% reactors are found the flock is classed as "United States pullorum-tested breeding chickens", (b) only breeding stock need be tested, and (c) the test need not be under supervision by a proper Live Stock Sanitary Officer. In the opinion of the committee these provisions are all contrary to successful eradication principles. Finally, the committee recommends that a revised nomenclature of poultry diseases be included in its forthcoming report to the next annual meeting of the Association.—C. V. WATKINS.

- KAURA, R. L. (1987). **Common Contagious and Parasitic Diseases of Poultry and Their Control.**—*Agric. Live-Stk India.* **7.** 745-755. 14 figs. on 3 plates.

There is a brief review of common poultry diseases in India. The need for correct management, breeding and feeding of poultry for the maintenance of freedom from disease is emphasized, and the essential measures for control of poultry disease are outlined. Newcastle disease is widespread in India. Wild birds, especially crows, assist in its spread. Serum of recovered birds (2.5-5 c.c. doses), followed in 24 hours by an infective dose of virus, confers a solid immunity. [This is not the usual experience: most workers consider that this method does not give satisfactory results].

Fowl plague has not been observed. In chronic fowl cholera cases, wry-neck, following localization of *Pasteurella aviseptica* in the brain, has been noted. Antiserum to lessen losses, and vaccine in enzootic outbreaks are recommended. Serious losses occur from avian tuberculosis of fowls, and other birds, especially when in captivity. It is said to be slow in onset and therefore rare in growing chicks [rarely diagnosed in growing chicks is probably more correct]. Bacillary white diarrhoea, fowl typhoid and coccidiosis all appear to cause more or less severe losses.—C. V. WATKINS.

- STENIUS, P. I. (1989). **Sjukdomar i våra pälsdjursgårdar.** [Diseases of Fur Animals in Finland].—*Suom. Eläinlääkärit.* **45.** 23-31.

Abortion in fur animals is often due to deficiency disease. Hairlessness in the young is caused by vitamin A deficiency, and vesicles on the pads of young animals are considered by some authors to have their origin in what is known as

a haemorrhagic diathesis which may be dependent upon nutritional deficiency. The nutrition of fur animals should therefore receive particular attention. Parasitic and infectious diseases are of frequent occurrence, but over-feeding and food poisoning are also common. Paratyphoid is the most prevalent of the infectious diseases. In controlling this disease, hygienic precautions should be taken, but immunization also gives good results. Most loss is due to distemper; no effective means of protection is known. Slaughter of infected animals, strict hygiene, isolation and adequate mineral rations are measures advised. Various antisera have all given unsatisfactory results except in mink; English distemper antiserum has been of considerable value in mink.—R. STENIUS.

GRIEDER, H. (1938). Krankheiten des Harn- und Geschlechtsapparates bei unseren Pelztieren. [**Uro-Genital Diseases of Fur Animals**].—*Dtsch. Pelztierz.* **13**. 405-407. 3 figs.

Calculus formation sometimes occurs in male fur animals bred and kept in captivity. In nutria and racoons it occurs all the year round, but in foxes and mink chiefly in January and February.

After parturition or abortion fox vixens are sometimes affected with cystitis, nephritis and peritonitis, secondary to metritis following retention of the placenta. The symptomatology is discussed.—SASSENHOFF (MUNICH).

- I. MILLEN, T. W., & EVELETH, D. F. (1938). **Chemical Changes in the Serum Associated with Equine Encephalomyelitis and Moldy Corn Poisoning in Horses**.—*Vet. Student*. **1**. 20-22. 2 tables. [8 refs.]
- II. HEAD, C. (1939). **Equine Encephalomyelitis not Infectious in Saskatchewan**.—*Vet. Med.* **34**. 431-433.

I. A comparison was made of the serum of horses affected with infectious equine encephalomyelitis and with mouldy corn poisoning. In the former disease the inorganic calcium content is normal or slightly depleted, and the inorganic magnesium is significantly lowered. In mouldy corn poisoning, however, the calcium is noticeably lowered, while the magnesium remains normal. Sugar content determinations in encephalomyelitis cases indicated that there was no marked disturbance of carbohydrate metabolism, but Van den Bergh tests detected hyperbilirubinaemia in three out of five cases of the disease.

Injection of mouldy corn extract caused a depletion of serum calcium similar to that caused by feeding mouldy corn. In one animal with incoordination, however, the calcium level rose to 14.7 mg. per 100 c.c. Autopsy revealed that one of the parathyroids was enlarged and contained a cyst 2 mm. in diameter.

II. The non-infectious type of equine encephalomyelitis due to the ingestion of mouldy food or stale water occurs in Saskatchewan and neighbouring districts, and outbreaks sometimes assume the proportions of local epizootics. The disease subsides rapidly on removal of the offending factor. Initial differentiation between it and infectious equine encephalomyelitis is difficult because of clinical similarity and the possibility of existence of both conditions in the same district.—D. D. O.

- I. FINDLAY, G. M., & MACCALLUM, F. O. (1937). **Note on Acute Hepatitis and Yellow Fever Immunization**.—*Trans. R. Soc. trop. Med. Hyg.* **31**. 297-308. [Numerous refs.]
- II. FINDLAY, G. M., & MACCALLUM, F. O. (1938). **Hepatitis and Jaundice Associated with Immunization against Certain Virus Diseases**.—*Proc. R. Soc. Med.* **31**. 799-806. [12 refs.]

III. PROPERT, S. A. (1938). **Hepatitis after Prophylactic Serum.** [Correspondence].—*Brit. med. J.* Sept. 24th. 677-678. [4 refs.]

I. A preliminary account of some of the cases described more fully in II.

II. Among 3,100 persons immunized against yellow fever with virus and convalescent serum, 89 cases of jaundice were traced. The symptoms were those of a hepatitis and closely resembled those produced by common infective hepatic jaundice. Attention is directed to the occurrence of hepatitis in horses, usually two or three months after immunization against the virus of horse sickness (Theiler, 1919) and against that of equine encephalomyelitis [see *V. B.* 8. 572, and MARSH, below]. The authors also refer to similar experiences after the injection into horses of horse serum containing antitoxins against *Clostridium welchii* toxin in an attempt to prevent "grass sickness". The clinical syndrome in horses affected in this way has been given the descriptive term of "staggers", while pathologically the main feature was acute degeneration of the liver parenchyma in the centre of the lobules. Similar symptoms were observed, though to a lesser extent, in a few normal horses. The only factor common to the inoculated horses and men was the injection of homologous proteins, either in sera or in tissue extracts. The only theories which at present explain the observed facts are that either (1) a hepatotoxic virus is introduced with the virus inoculum, or that (2) two factors combine to induce hepatitis—(a) a hepatotoxic substance present in the homologous sera or tissue extract injected and (b) an infective agent which, at least in the case of human beings, is probably the causal agent of common infective hepatic jaundice.

III. A brief note recording the occurrence of hepatitis and jaundice in seven children who were inoculated with convalescent measles serum as a prophylactic. Symptoms developed 78-83 days after inoculation, and in the early stages the disease was indistinguishable from common infective hepatitis, although the later stages were more severe and terminated in death. Two months after the above cases of jaundice appeared, two uninoculated children developed jaundice indistinguishable from the common infective hepatitis. P. considers that these cases confirm the second theory advanced by FINDLAY and MACCALLUM [see I above].

—N. J. SCORGIE.

MARSH, H. (1937). **Supplementary Note to Article on Equine Encephalomyelitis.** —*J. Amer. vet. med. Ass.* 91. 330-331. [1 ref.]

M. refers to the similarity between deaths that occurred after immunization against equine encephalomyelitis [*V. B.* 8. 572.] and acute liver atrophy of horses immunized against African horse-sickness [THEILER. (1919). *5th & 6th Rep. Direct. Vet. Res. S. Africa*].

M.'s 89 cases (1.5% of all horses immunized) in Montana became ill 32-92 days after immunization by serum and virus or serum alone. He suggests that serum treatment followed by exposure to the virus played a part in the genesis of the liver syndrome [see also COX *et al.* *V. B.* 9. 540].—J. E.

KUCEL, J. (1938). Izvještaj o pojavi jedne po kliničkim simptomima Borna (meningo-encephalomyelitis equorum) slične bolesti kod konja na području sreza Veliko Goričkog. [Record of a Disease of Horses Simulating Borna Disease in the District of Velika Gorica (Yugoslavia)].—*Jugoslav. vet. Glasn.* 18. 501-504. 4 figs. [3 refs.]

Towards the end of the summer of 1938, a previously uninvestigated disease broke out among horses in the district of Velika Gorica (southern vicinity of Zagreb, Yugoslavia). The disease set in suddenly and appeared to be a nervous infection; the body temperature was slightly above normal. The symptoms

resembled those of Borna disease, but an intense yellow atrophy of the liver was found. Within less than two months 442 horses contracted the disease. No successful mode of treatment was found. The disease [now called "Mraclin" disease, the name being derived from the village where it was first observed in the district of V.G.] is now being studied at the Veterinary College, Zagreb. K. is of the opinion that the condition may be identical with that described by BERNHARDT [(1928). *Tierärztl. Rdsch.* **34**. 841]. [It might be of interest to compare these cases with those described in connexion with equine encephalomyelitis in the two immediately preceding abstracts].—B. OSWALD (KRIŽEVCI).

TODD, A. G., & SOUTAR, J. J. M. (1939). **Influenza**.—*Rep. 13th int. vet. Congr. 1938*. **2**. 1202-1213. [6 refs.] [In English: French, German and Italian summaries. Discussion pp. 1233-1237 in English and French]. [Reprinted in *Vet. Bull. U.S. Army*. **33**. 146-158].

Under peace-time conditions equine influenza is usually not very prevalent, but in war-time it may assume formidable proportions owing to the concentration of large numbers of animals in small areas. Horses which contract the disease under favourable conditions of health and environment vary somewhat in their reactions, but serious complications are very rare. On the other hand cases which arise in unfavourable circumstances such as in the course of shipping, on lengthy train journeys, or during adverse climatic periods, are usually complicated by pneumonia or other sequelae. The period of convalescence depends largely on the previous condition of the animal. Well-conditioned acclimatized horses in India have recovered in two or three weeks, while newly-landed animals required six to twelve months before they were fit for service.

In the field the most successful method of dealing with the disease appears to be complete cessation of all work in infected units, with entire rest during the pyrexia stage. The animals are allowed to remain at liberty in paddocks, but are strictly isolated. After severe symptoms subside they are walked in hand, and subsequently if they can be trotted without coughing they are gradually returned to work. Fast work early on predisposes to strains and roaring and is therefore to be avoided. In the benign type of the disease the policy of mixing infected and non-infected animals is justified, and is probably the best way of reducing the duration of an outbreak to a minimum.

Recently the intravenous injection of 8 g. of neosalvarsan in 60 c.c. of distilled water has given excellent results in the medicinal treatment of severe cases.

—D. D. OGILVIE.

MINTSCHEW, P. (1938). Ueber die Aetiologie, Therapie und Prophylaxe der Mondblindheit. [**Aetiology, Therapy and Prophylaxis of Equine Periodic Ophthalmia**].—*Tierärztl. Rdsch.* **44**. 748-753 and 761-769. 1 fig., 3 tables, 1 chart. [Numerous refs.]

M. suggests the theory that periodic ophthalmia is caused by intoxication by histamine or by an agent with a comparable action present in the blood of affected horses. He states that he set up the disease in horses by an intra-arterial injection of histamine. He considers that it is possible that histamine is produced in some way by digestive derangement, and suggests that laminitis may be a manifestation of histamine poisoning. He discusses curative treatment, giving considerable detail about drugs used, and advocates a preventive method depending on periodical dosage with lactic acid and pilocarpine.—V. CHLÁDEK (PRAGUE).

WESTHUES, M. (1988). Ueber das Wesen, die Diagnostik und die Therapie der Podotrochlitis chronica des Pferdes. [**Nature, Diagnosis and Therapy of Navicular Disease of Horses**].—*Berl. Münch. tierärztl. Wschr.* Dec. 23rd. 781-785 and Dec. 30th. 797-802. 19 figs. [3 refs.]

From numerous examinations of the feet of horses selected at random after death, W. found that degenerative changes on the deep surface of the navicular bone and on the opposed surface of the deep flexor tendon are very common in horses from eight years of age upwards. The change starts on the surface of the tendon, which in the early stage shows a change of colour, a loss of transparency of the surface layer, and later small erosions and exposure of the tendon fibres. Microscopically the cells of the tendon tissue show lipid degeneration, and necrosis.

The navicular bone becomes affected secondarily and shows similar changes. The condition is called podotrochlosis, and it is essentially degenerative and not inflammatory. Inflammation, as opposed to the degenerative surface changes referred to above, only occurs in the deeper parts of the tendon and navicular bone when the podotrochlosis is advanced.

W. believes that podotrochlosis is the result of overburdening of the forelegs; it occurs chiefly in riding horses. Diagnosis and treatment are discussed in detail.

—V. CHLÁDEK (PRAGUE).

MÜLLER, E. (1939). Ueber den Beginn der Hufknorpelverknöcherung. [**The Genesis of Sidebones**].—*Tierärztl. Rdsch.* 45. 90-92. 2 figs. [10 refs.]

M. examined the feet of horses before and after slaughter and studied closely 41 lateral cartilages. In 17 cases the cartilages had become more or less ossified, the process starting at the point of attachment to the third phalanx, and in 10 cases there were ossification centres in the cartilage remote from the point of attachment. With regard to pathogenesis it was observed that the ligaments of the lateral cartilages exert traction on the cartilages when the pastern is at a steep angle with the ground; this evidently causes some irritation at the junction of cartilage and ligament and it is there that ossification commonly starts. The cause of isolated ossification is obscure.

The histological character of incipient ossification is described.

—V. CHLÁDEK (PRAGUE).

ERLER. (1938). Beitrag zu Ursache und Wesen des Blutschwitzens der Pferde. [**Causes and Nature of Blood Sweating in Horses**].—*Z. Veterinärk.* 50. 514-521. 1 fig. [14 refs.]

E. examined 20 affected imported horses whose average age was nine years. With the appearance of hot summer weather nodules the size of hazel nuts were seen in the skin, as many as 60 nodules being seen in one horse alone; there was blood exudation from these nodules, and this appears to be the reason for the term used in the title. The nodules were solid and did not cause any pain. Examination of the blood revealed the following:—(1) no microfilariae were found in any of the subjects, (2) lymphocytosis and neutropenia were seen in 45% of the horses, (3) 20% showed eosinophilia, and (4) 40% showed a diminution in the number of erythrocytes. E. concludes that the condition was not of parasitic origin.—A. L. WILSON.

I. RADTKE, G. (1938). Untersuchungen über die Ursache und das Wesen der Schnüffelkrankheit des Schweines. [**Cause and Nature of Infectious Rhinitis of Swine**].—*Arch. wiss. prakt. Tierheilk.* 72. 371-423. 26 figs., 16 tables. [Numerous refs.]

II. RADTKE, G. (1938). Die Ursache und das Wesen der Schnüffelkrankheit des Schweines. [**Cause and Nature of Chronic Rhinitis in Swine**].—*Berl. Münch. tierärztl. Wschr.* October 21st. 637-639. [1 ref.]

I. A careful anatomical, histological and bacteriological examination of the upper respiratory tract was made on groups of healthy and affected pigs. The morbid anatomy and histopathology of infectious rhinitis and influenza are described. It was found that rhinitis leads to chronic changes ending in atrophy of the parts and occlusion of the nasal cavities and sinus. Whereas in healthy stock the ethmoid sinuses and nasopharynx were practically free of bacteria, in 40 % of infected animals the influenza bacillus was recovered from these parts. When healthy stock was injected intranasally with secretion from pigs with rhinitis, a bronchopneumonia such as that which occurs in influenza was often induced ; conversely, material from lung lesions in influenza cases caused rhinitis. The conclusion drawn is that infectious rhinitis is a chronic form of influenza localized in the upper respiratory tract. [The possibility of the two diseases being present together in the inocula does not appear to have been eliminated.] [See also *V. B.* 8. 39 and 526].

II. An abbreviated article summarizing the above.—P. S. WATTS.

RUDAU, J. (1939). Zur Frage des akuten Herztodes der Schweine. [**On the Question of Syncope in Pigs**].—*Tierärztl. Mitt.* 20. 65-67.

R. asserts that in East Prussia ten times as many pigs are lost from syncope as from other diseases and that the associated heart disease is a sign of poisoning by zinc or, less often, by copper compounds. The number of pigs affected increases year by year as more zinc vessels are used. Steam under high pressure removes particles of zinc from zinc surfaces, and such a process may occur when food is being cooked in a zinc vessel if little water is used, so that the particles of zinc may thus contaminate the food. If, however, the vessel is filled with water the reaction does not take place. The use of iron steamers is advocated. Again, zinc lactate may be formed when very sour milk is kept in zinc pails for a long time.—G. WILLIAMSON.

ANON. (1938). **Stiff Lamb Disease in Illinois**. pp. 1. Urbana, Ill.: University of Illinois. [4to] [Mimeographed].

This disease has been reported from several eastern and far western states, and seems to be increasing in flocks in Illinois. A paralysis occurs in lambs two to eight weeks old, and the greatest losses are amongst those turned out to pasture. The cause is unknown, but the disease has not been found in " hot-house lambs " [presumably lambs being fattened] and rarely in late lambs.

Within a few days the affected lambs die from starvation and exhaustion following paralysis ; growth is impaired in the few animals which recover.

In advanced cases nearly all the muscles of both the fore and hind limbs are affected ; the lesions are degenerative and not inflammatory in character, and negative results of cultural and inoculation tests show that they are not due to bacterial invasion.

No specific preventive measures can be recommended until there is definite proof of the aetiology of the disease, but it is suggested that diets containing a minimal amount of protein should be fed before and after lambing.

NÖRR, J. (1938). Massensterben von Lämmern durch Herzmuskelverkalkung mit dem klinischen Befund von Extrasystolen. [**Losses among Lambs from Calcification of the Heart**].—*Arch. wiss. prakt. Tierheilk.* 74. 25-38. 8 figs. [Numerous refs.]

Sixty of a flock of winter lambs died early in the year, the majority during mild, wet weather. The cause was neither infection nor parasites. All the affected animals came from one fold, under which a dowser had stated that three streams met. The affected lambs had wart-like nodules on the lips; there was debility and the pulse was irregular. Yellow, opaque calcareous foci were scattered throughout the myocardium, but the skeletal musculature was free from such foci. No more cases occurred after the sheep were turned out to pasture. Three lambs recovered in the author's clinic. The exact cause of the condition was not determined.—V. CHLÁDEK (PRAGUE).

SJÖBERG, K. (1938). Blodets kemiska sammansättning. I. Förändringar i samband med partus hos ko. II. Vid puerperal hämoglobinemi hos nöt. [**Chemical Composition of the Blood. I. Of Parturient Cows. II. In Bovine Puerperal Haemoglobinaemia**].—*Svensk VetTidskr.* **43**. 285-305 and 335-345. 5 figs., 6 tables. [Numerous refs.] [See also *V. B.* **3**. 221].

I. Physiological variations in the chemical composition of cows' blood in relation to parturition were investigated. Blood samples were collected from six cows at varying intervals from 98 days before parturition to 51 days after. Analyses were carried out of the concentrations of the undermentioned constituents only.

Soon after parturition the inorganic P of the blood plasma as well as of the corpuscles decreased to about one third of the normal level. In the corpuscles the minimum concentration was reached 1-2 days later than in the plasma. The content again returned to normal in a few days. The concentration of phosphoric acid esters in the corpuscles showed tendencies similar to those of the inorganic P. The phospholipid and cholesterol contents decreased a few days before parturition, remained low for 2-3 weeks and then rose. The cholesterol/lecithin ratio and the action of the plasma phosphatase showed only slight alterations, with, however, a certain decrease in parturient cows.

II. The chemical composition of the blood of 25 cows naturally affected with puerperal haemoglobinaemia were examined [for a description of the disease see HJÄRRE (1930). *Acta path. microbiol. scand.* Suppl. No. 7]. The blood of four cases of non-puerperal haemoglobinaemia was included for comparison, as was the blood of some of the cows after recovery, that is, 5-8 weeks after parturition.

The analyses proved that the concentration of inorganic P in the plasma was very low, in some cases only one tenth, of that of the blood of healthy cows at the same stage after parturition. In healthy cows no phosphoric acid esters are present in the plasma, but in affected cows traces, up to 2.8 mg. %, were found. In some cases the inorganic P content in the corpuscles was decreased, but as a rule it remained normal. The concentration of phosphoric acid esters in the corpuscles varied considerably and was in some cases very low. The lecithin and cholesterol concentrations varied within normal limits.

In connexion with the finding of the low P concentration in the blood, several hay samples from the districts where the disease prevails were analysed. Ca was high, whereas P was significantly low, a fact that might be a contributory cause to the low P concentration in the blood. Other explanations are also discussed.

—GUSTAV NAERLAND (OSLO).

FOOY, J. P. (1936). Over de renale en extrarenale uraemie bij onze huisdieren. [**Uraemia in Domestic Animals**].—*Tijdschr. Diergeneesk.* **63**. 649-659. [6 refs.] [English, French, and German summaries].

After giving a brief account of the symptoms of uraemia in domestic animals, F. discusses two cases observed by him in horses. At autopsy these animals were

found to have suffered from obstruction of the oesophagus and of the colon, while their kidneys were normal, indicating that uraemia was extrarenal.

TOMAN, R. V. (1987). Ervaringen met de behandeling van de steriliteit bij de merrie. [Treatment of Sterility in Mares].—*Tijdschr. Diergeneesk.* **64**. 1222-1225. [German summary].

T. describes his technique for examining mares, and gives his general experience in practice. He advocates exploration and treatment of the uterine cavity through the os uteri at the oestral periods. [There appear to be objections to this system].—JAC. JANSEN (UTRECHT).

- I. POTEL, K. (1988). Histologische Untersuchungen zum Wesen der sogenannten Marek'schen Geflügellähme.—[Histological Research on Fowl Paralysis].—*Z. InfektKr. Haustiere.* **54**. 148-154. 1 fig. 1 table. [9 refs.]
- II. FRITZSCHE, K. (1988). Kritische Betrachtung zur Aetiologie der Marek'schen Hühner-Lähme. [Aetiology of Marek's Fowl Paralysis].—*Dtsch. tierärztl. Wschr.* **46**. 791-794. [Numerous refs.]

I. P. examined the internal organs and nerves of 32 hens with clinical fowl paralysis. In 10 of them there were macroscopic new growths in the internal organs and in a further 8 cases there was found a lymphocytic infiltration of the internal organs and also of the nerves. A detailed examination of the latter showed the presence of large numbers of lymphocytes and lymphoblasts which showed signs of mitosis and degeneration. The destruction of nerve fibres in this disease is not primary but secondary, being caused by pressure from the above cell overgrowths which originate in the connective tissue of the nerve fibres and bundles. The whole process is neoplastic in nature and not inflammatory. This observation supports the assumption that fowl paralysis and fowl leucosis are etiologically related.

II. This is a general survey of research into fowl paralysis. There is to-day no doubt that F.P. is transmissible artificially, and in various experiments positive results have varied between 5% and 80%. For instance, JUNGHERR obtained positive results in 88.2% of cases and HARTWIGK 80% positive results, in attempting to produce the disease in the offspring of infected hens. The great differences in the results of different workers can be explained by the assumption that F.P. is essentially a disease of very young birds, and that the causal agent is very variable in virulence. Many birds seem to have a strong natural resistance against the disease, and attempts to affect such birds experimentally usually fail. Another difficulty has been due to the choice of control birds, which develop F.P. presumably because they are from stocks in which it has occurred. Some workers have reported natural infection from contact and from the ingestion of the excreta of affected birds (SEAGAR, FRITZSCHE and JUNGHERR). Some authors believe that there is a hitherto unknown causal factor, possibly operating by way of nutrition or constitution, though the work of LERCHE, FRITZSCHE and HEPDING has failed to indicate any connexion between F.P., diet and general management.

F. has failed repeatedly to demonstrate any spontaneous outbreak of F.P. in which it was possible to exclude the possibility that the disease originated from previously affected animals.

PACINI, and also BUTLER and WARREN, have demonstrated that paralysis other than F.P. can be caused by vitamin E deficiency, but that has evidently nothing to do with the condition known as fowl paralysis, as cases of the former can be cured but not cases of F.P. Since wheat has been forbidden for use as poultry food in Germany, F.P. has not increased.

It is believed that susceptibility is connected with a certain constitutional state of receptivity, though experiments on this point have not given any direct evidence that the state is inherited and it has not been possible to breed strains of fowls having a definite tendency or resistance to F.P.

The causal agent of F.P. passes through filter candles and remains viable for some months in 50 % glycerin. The enzyme theory of LESBOUYRIES, found by experiment, is not supported by JUNGHER who was able to produce the disease with nerve material which had been dried for 82 days.

For control purposes the author has had some success with the employment of hygienic measures.—SASSENHOFF (MUNICH).

BARBER, C. W. (1939). **A Study of Fowl Paralysis. Part I. Antemortem Diagnosis.**

—*Cornell Vet.* **29**. 41-44. 1 table. [4 refs.]

B. describes a method of diagnosis in the living bird based on exposure and examination of the sciatic nerve for macroscopic changes.

Twenty-one birds with neurolymphomatosis gallinarum, many of which were shown by the operation described to be affected, daily received by the mouth one or two 1 c.c. capsules containing cold, pressed wheat germ oil. The course of the disease was not affected by the administration of the oil.—L. E. HUGHES.

WARREN, D. C. (1937). **Physiologic and Genetic Studies of Crooked Keels in**

**Chickens.**—*Tech. Bull. Kans. agric. Exp. Sta.* No. 14. pp. 32. 3 figs., 15 tables. [7 refs.]

This bulletin details experimental study of "crooked keel" in chickens from 1926-1937 at the above experiment station. The age incidence of the deformity was most frequently between 6 and 12 weeks, but cases occurred in affected strains up to 6 months or later. Chemical analysis of the breast bones showed that there was a lower dry ash percentage in affected strains than in straight-keeled birds, but the analysis of leg bones from each group was similar. The growth rates and fecundity of affected birds was normal and there was no increased susceptibility to rachitic conditions. The period of hatching had no bearing on the incidence of the condition.

A genetic study conclusively demonstrated an inherent tendency to the development of crooked keels in some strains. However, the conditions of roosting, especially the age at which this commenced, the sharpness of the perches and the conditions of husbandry (overcrowding, etc.) which in turn determined the relative amount of perching time, had their effect upon the incidence of the disease in the experimental groups, and even counteracted the hereditary tendencies. Male birds were found to be more susceptible to the deformity than females.—C. V. W.

JÁRMAI, K. (1938). Ueber die Wirksamkeit der Eiweissfraktionen bei der übertragbaren Hühnerleukose. [**Action of Protein Factors in Transmissible**

**Fowl Leucaemia**].—*Arch. wiss. prakt. Tierheilk.* **73**. 295-300. [4 refs.]

A strain of erythroleucosis was maintained for eight years in fowls without changing type, the causal agent being firmly tropic for the erythropoietic system. The incubation period of the strain was at first 10-12 days, or 20 days if the material was preserved in glycerin; in the course of the eight years the incubation time gradually became shorter, the shortest period being seven days. The shorter the incubation period, the lower was the pathogenicity. While the period was still more than 14 days, it showed seasonal variation, being longer in January-June than in July-December. Globulin and albumin of hens' blood were tested for their pathogenicity by the technique employed by VON MÓCSY [see p. 848.] in

equine infectious anaemia. It appeared that the causal agent of fowl erythro-leucosis is connected with the globulin fraction, and hardly at all with the albumin fraction. The globulin fraction of hens' blood retains its virulence despite flocculating out in saline suspension. This fact suggests that the causal agent cannot be a living organism. Neither the disease nor immunity against it can be produced by dried globulin.—SASSENHOFF (MUNICH).

SCHÄPER, W. (1938). Entstehung und Bekämpfung der Rinderleukose im Lichte der Konstitutionsforschung. [**Development and Control of Leucosis in Cattle in the Light of Research into Constitution**].—*Dtsch. tierärztl. Wschr.* **46**. 833-837. [Numerous refs.]

The incidence of this disease in Germany appears to be rising and its distribution is more wide-spread than when the first work dealing with it was recorded in 1917. Animals of the "schwarzbunten Niederungsvieh" breed are most commonly affected, those of other breeds being relatively free from the disease.

Evidence is cited in support of the view that certain animals may produce progeny in which the incidence of the disease is especially high. It is stressed that affected cattle of either sex and their parents and grandparents should be excluded from breeding.

Such factors as high milk production, environmental conditions and tuberculosis are not known to have any effect on the incidence of the disease. S. uses the word "constitution" to mean the general state of the animal, including both inherited and acquired characters [see *V. B.* **7**. 48].—E. G. WHITE.

SAAR, W. (1937). Koduloomade lüfomatoos ja selle hinnang lihavaatustes. [**Lymphomatosis in Animals and Its Meat Inspection Aspect**].—*Eesti loomaarstl. Ring.* **13**. 158-163. [11 refs.]

Lymphomatosis is rare in Estonia. S. has only observed four cases among 12,000 head of cattle slaughtered and two cases in 40,000 pigs.

According to the meat inspection regulations affected bovine carcasses are condemned as not being fit for human consumption. In pigs, affected lymph nodes and tissues are removed and the pork given to the owner with the instruction that it should be well boiled before consumption.—ELFRIDE RIDALA (TARTU).

KIPPER, A., & KEERD, M. (1937). Veiste nn. neurofibromatoosist. [**Nerve Tumours in Cattle**].—*Eesti loomaarstl. Ring.* **13**. 185-210. 12 figs. [Numerous refs.] [German summary].

At the abattoir of Tartu in the year 1935 neurofibromatosis was diagnosed in 1.8% of all the cattle slaughtered in one month, and in 1.3% in another month. From October 1st 1935 till January 1st 1937, 54 cases were diagnosed; 20 of the cases were studied in detail. The disease occurred more frequently in old cows, and tumours were most often found in the intercostal nerves, the nerves of the brachial plexus, the cardiac and thoracic part of the aortic plexus, and more rarely in the nerves of the oesophagus, neck and tongue, and in the nerves of the mesentery. The histological examination showed that nine cows had sarcoma, five fibrosarcoma, three fibrosarcoma and sarcoma, and three sarcoma, fibrosarcoma and fibroma. All the tumours examined were surrounded by a layer of connective tissue formed by the thickening of the perineurium. Histological examination showed that the tumours originated in the endoneurium. As the tumours grow bigger, the neighbouring nerve fibres are compressed, which results in a disturbance of the lymph and blood circulation, the tumours become oedematous and hollow spaces appear filled with a gelatinous coagulable fluid. The hollow spaces are enlarged interfascicular lymph spaces that communicate with

subdural and subarachnoid spaces; they are not enlarged lymphatic vessels as some authors maintain. The transition between fibroma and fibrosarcoma, and between the latter and sarcoma is not always easy to fix histologically, because sometimes intermediate forms occur. The tumours that are histologically malignant were usually of larger dimensions. In all the tumours examined there was perivascular lymphocytic infiltration. Sacromata originate between the nerve fibres and, as they grow they compress the nerve fibres. All sarcomata found were spindle-celled.—ELFRIDE RIDALA (TARTU).

NICKEL, R. (1939). Blut- und Lymphgefäßsystem des Darmes als Infektionsspforte. I. Bestehen direkte Verbindungen zwischen den Darmlymphgefäßen und der Pfortader. [**The Blood and Lymphatic Systems of the Intestines as Infection Atria. Connexion between the Intestinal Lymphatic System and the Portal Vein**].—*Dtsch. tierärztl. Wschr.* **47**. 91-93. 2 figs. [2 refs.]

Experiments on 15 dogs, 7 piglets and 2 calves showed that there is no direct connexion between the lymphatic system of the intestines and the portal vein as stated to be the case by BONGERT [(1924). *Z. Fleisch- u. Milchhyg.* **34**. 201]. The experiments were performed by rubbing a coloured liquid into the epithelium of the intestines, and by injections into the submucosa, the lymph nodes and the lymphatic vessels. Injections into the lymph nodes cannot be done without perforating blood capillaries as well, thereby nullifying the results. N. concludes that it is not yet clear how the liver and its lymph nodes become infected from an intestinal infective focus.—V. CHLÁDEK (PRAGUE).

GREENE, H. S. N., & SAXTON, J. A., Jr. (1939). **Hereditary Brachydactylia and Allied Abnormalities in the Rabbit**.—*J. exp. Med.* **69**. 301-314. 14 figs. on 2 plates, 2 tables. [6 refs.]

Genetical study of a series of deformities in the rabbit ranging from brachydactylia to acheiropodia has shown their occurrence to be determined by simple recessive hereditary factors. The deformities occur in a single genetic line and breed true. Abnormalities of the ear consisting of various localized defects appear to arise from the same fundamental variation. Embryological examination, commencing at the 16th day of foetal life, demonstrates that such abnormality is first shown by capillary dilatation and extravasation of blood in the affected parts. Necrosis and sloughing follow in a few days, and the deformity is completely demarcated by the 25th day of foetal life.—D. D. OGILVIE.

OSTERTAG, H. (1937). Ueber glandulären Hermaphroditismus beim Schwein unter besonderer Berücksichtigung des histologischen Bildes. [**Glandular Hermaphroditism in Swine and the Histological Picture**].—*Frankfurt. Z. Path.* **51**. 944-962.

An interesting anatomical and histological study of the sex organs of pigs showing varying degrees of hermaphroditism. Those interested should refer to the original article which contains a comprehensive bibliography and is well illustrated.—E. J. PULLINGER.

SALOMON, L. (1938). La glande interstitielle du testicule. Son histophysiologie générale et ses tumeurs chez les mammifères domestiques et chez l'homme. [**The Histology, Physiology and Tumours of the Interstitial Gland of the Testicle of Domestic Mammals and Man**].—*Thesis, Alfort*. pp. 306. 46 figs. [Numerous refs.]

This exhaustive monograph is largely a review of the literature dealing with

the interstitial tissue of the testis of man and animals. Most of the illustrations are reproduced from recent papers of various authors. An extensive bibliography is provided.

The first two chapters are of special interest to the veterinarian, the first dealing with the general classification of testicular tumours and the second with the author's own observations on the testes of 392 dogs 5-15 years old. Some of the cases were examined P.M. and in the remainder material was obtained at biopsy. A total of 71 animals showed testicular tumours and in 22 of these the lesions were bilateral. A variety of other pathological conditions affecting the testes are also enumerated. The majority of the tumours were classed either as seminoma or as interstitial cell tumour, in the ratio of approximately 4:3. The classification according to the size of the tumours as "tumeur" or as "nodule" makes the tables difficult to interpret.

S. was able to demonstrate by special cytological technique the presence, within the interstitial cells of the testis of the dog, and more easily in tumours arising from these cells, of cristalloids similar to those long ago recognized in the normal human testis but absent when the organ undergoes degeneration or involution.

The features which differentiate interstitial cell tumours from seminoma include the spongy nature of the cytoplasm, scarcity of glycogen, the characters of the Golgi apparatus and cristalloids, and the arrangement of the vessels.

Although the two types of tumour are usually found separately, cases were found in which both types occurred together, and it is even stated that transition of the neoplastic cells of a seminoma into those of an interstitial cell tumour can take place.—E. G. WHITE.

ANDERSON, C. G., & OAG, R. K. (1939). **The Effect of Gastric Mucin on the Pathogenicity of the Meningococcus and Other Organisms : with Particular Reference to its Fractionation.**—*Brit. J. exp. Path.* 20. 25-32. 1 table. [10 refs.]

A brief review of the literature upon the effect of gastric mucin on the infectivity for mice of gonococci, meningococci, pneumococci, *Staphylococcus aureus* and *Haemophilus influenzae* is given [see also *V. B.* 9. 258, and 483-485].

The authors detail experiments with an autoclaved 5% mucin suspension. This was mixed in equal parts with a suspension of 18 hours' growth of two strains of meningococci on blood agar plates and injected (0.5 c.c. intraperit.) into mice. By this treatment the lethal dose of both strains was reduced to about 5% of the normal amount.

The authors describe fractionation of crude commercial mucin (aqueous solution, alkaline and acid extracts, and alcohol precipitates), the preparation of human salivary mucin, and the hydrolysis and trypsin digestion of mucin (yielding protein, carbohydrate and amino-acid fractions. Meningococci mixed with the above preparations or with numerous other substances (gums, oils, starches, adsorbents, colloids, proteins, carbohydrates and other substances) were tested on mice in the same way as the crude mucin, and the results are tabulated. Only the protein fraction of mucin activated the virulence of meningococci. Among the "other substances" agar and certain carbohydrate fractions of diphtheria bacilli alone enhanced the virulence of mucin.

Gastric mucin greatly enhanced the virulence of *Staphylococcus aureus* and certain haemolytic streptococci for mice, but did not affect *Streptococcus viridans*, *Salmonella typhi*, *Bact. coli* and *B. anthracoides* when tested in the same way.

The authors conclude that the viscosity of mucin is probably not the only factor producing these effects.—C. V. WATKINS.

# NUTRITION IN RELATION TO DISEASE

- (1939). **Nutrition and the Public Health. Proceedings of a National Conference on the Wider Aspects of Nutrition, April 27-28-29, 1939.** pp. 150. 4 tables. London: British Medical Association. [8vo] [2/6].

The conference was organized by the British Medical Association with the object of drawing the attention of the public and of the government to the nutrition of the nation and to the need for a long term food policy.

Many papers were read and discussed. Professor Miller gave an outline of the field of activity of the veterinarian in relation to public health (control of animal disease, food inspection, colonial work and prevention of disease).

The following resolution was passed:—

"This Conference called by the British Medical Association and composed of representatives of medicine, agriculture at home and overseas, industry, and education, is deeply impressed with the importance of nutrition to the national welfare. It urges upon the Government the formulation of a long-term food policy in which the requirements of health, agriculture and industry shall be considered in mutual relation. It is convinced that measures to secure the more ready availability to all sections of the community of foodstuffs which are held to be desirable on nutritional grounds should be accompanied by an educational campaign to encourage their increased consumption."—J. E.

- QUIN, A. H. (1939). **Some Factors Involved in the Deficiency Diseases.**—*J. Amer. vet. med. Ass.* **94**. 621-626. [13 refs.]

This article comprises a very scanty general survey of the deficiencies due to lack of inorganic mineral elements and of the vitamins. Detailed criticism is irrelevant since the article contains very little that is new. It comprises short accounts of deficiencies associated with Ca and P, NaCl, I, Fe and Cu, and Co, but it is surprising to read that the author was "not acquainted with any blood chemistry studies of grass tetany", that the disease is "probably due to a quick depletion of body Ca" and that "steamed bone flour should serve as a specific preventive". Brief accounts are given of the vitamins A, D, C, E, K, the B and B<sub>2</sub> complex and the "skin factor". [In many cases undue prominence is given to work which has yet to be substantiated, leaving aside established knowledge on the subject. For a general review of the various factors involved in deficiency diseases, the reader will find it more profitable to consult the standard works on the subject].—ALFRED EDEN.

- AUCHTER, E. C. (1939). **The Interrelation of Soils and Plant, Animal and Human Nutrition.**—*Science*. **89**. 421-427. [4 refs.]

The need for a closely coordinated scientific attack on the problems connected with the production of food of a high nutritional quality and not merely a large quantity is stressed in this address. Some factors affecting the value of plants as food, and soil deficiencies resulting in nutritional disorders of plants, animals and human beings are briefly discussed. It is suggested that more effort should be made to correlate agricultural production with the physiological needs of animals and human beings.—R. ALLCROFT.

- GREENLEE, C. W. (1939). **The Skeletal Diseases of Horses and their Relation to Nutrition.**—*Cornell Vet.* **29**. 115-124. 3 figs. [5 refs.]

Skeletal diseases are responsible for much disability in equines. While with an adequate diet minerals are stored in the skeleton, when the ration is insufficient minerals are withdrawn. Some writers consider that spavin, ringbone, sidebone, splint, arthritis and navicular disease are local manifestations of general systemic

disease (osteoporosis, osteomalacia and rickets). The author had 686 horses and mules under observation and made P.M. examinations of 184 of these. In each case there were degenerations of articular cartilages. He considered that malnutrition was the cause and fed the 502 survivors an improved ration containing alfalfa hay. After one year the number showing abnormal posture was reduced in horses from 80 % to 5 % and in mules from 80 % to 2 %. Of 284 aged horses and mules condemned to be destroyed immediately, which were reprieved owing to the impossibility of replacing them, 42.3 % were still doing duty over three years later. These had received the improved ration.—J. A. GRIFFITHS.

HAMILTON, B., & HIGHMAN, W. J., Jr. (1938). **The Changes in Total Calcium Content of the Bones During the Development of Rickets.**—*J. Nutrit.* 15. 177-186. 3 tables. [14 refs.]

It is shown that, when rickets is produced in rabbits by feeding on a rachitogenic diet, there is a loss or, at most, only a slight increase, of the total calcium content of the metatarsal bones during the period the animals are fed on the diet. The method employed was to amputate one leg before the diet was started and compare the calcium content of the bones of this leg with that of the other, removed after the end of the period of feeding. By estimating the daily amounts of calcium liberated from the metatarsal bones, the authors conclude that even if the amounts of calcium absorbed from the intestines were considerably decreased, the amounts liberated from the bones would generally be sufficient to maintain a normal concentration of calcium in the tissue fluids. [It is interesting to note that rabbits which were operated on, after being four weeks on the rachitogenic diet, succumbed to the operation more readily than animals operated on before the commencement of the experimental feeding period].—N. J. SCORGIE.

CORNER, H. H., & SMITH, A. M. (1938). **The Influence of Cobalt on Pine Disease in Sheep.**—*Biochem. J.* 32. 1800-1805. 1 table. [18 refs.]

Analysis of the soil and herbage of various pining and non-pining farms in the Cheviot region of Scotland revealed adequate amounts of Fe, Mn and Cu and small but variable amounts of Co. Following Australasian analogies, daily drenchings of sheep with  $\text{CoCl}_2$  prevented or cured the disease, and the beneficial effects from feeding crude Fe compounds are attributed to the presence of Co as impurity. 1 mg. Co per day for 14 days was effective in preventing the disease on pining land for six months, and it is concluded that pine disease in sheep is a nutritional anaemia, curable or preventable by the administration of Co.

[In view of the many misquotations of this work already appearing in the literature, it should, in fairness to the authors, be pointed out that they did not claim the disease as a Co deficiency nor do their figures necessarily show a pronounced and significant difference in the Co content of the herbage and soils between pining and non-pining farms. All that their results show and, indeed, all that they claim is that the disease is a nutritional anaemia curable by Co. It may be mentioned that the parasitological side of the disease, although very considerable and important, is not considered, and no suggestion is made about the strong possibility that the anaemia is secondary and consequent upon a heavy worm infestation].—ALFRED EDEN.

CASKEY, C. D., & NORRIS, L. C. (1939). **Relative Effectiveness of Ingested and Injected Manganese in Preventing Perosis.**—*Proc. Soc. exp. Biol., N.Y.* 40. 590-598. 2 tables. [9 refs.]

The results of supplying Mn in the diet of Rhode Island Red chicks for

period of six weeks showed that a level of 1.5 mg. Mn per 100 g. of a diet containing 1% Ca and 0.5% P was just as effective in preventing the development of perosis as a level of 14 mg. of Mn per 100 g. of a diet containing 3% Ca and 1.5% P. As the Mn level in either the low Ca:P diet or the high Ca:P diet was increased, the final average weight of the chicks increased and the incidence of perosis decreased.

That injected Mn was much more effective than ingested was demonstrated by the fact that the intraperitoneal injection of 10 mg. of Mn per chick during the experimental period of six weeks completely prevented the development of perosis, even though the chicks received the high Ca:P diet, whereas an oral intake of 141.7 mg. was only partially effective in the prevention of perosis. The injection of 20 and 60 mg. of Mn during the experimental period also completely prevented perosis but retarded the growth considerably. It is concluded that Ca and P when present in the diet in excess amounts greatly reduce the availability of Mn in the intestinal tract.—R. ALLCROFT.

BERNHEIM, F., & BERNHEIM, Mary L. C. (1939). **Note on the Action of Manganese and Some Other Metals [Cobalt] on the Oxidation of Certain Substances by Liver.**—*J. biol. Chem.* **128**. 79-82. 2 figs., 1 table. [2 refs.]

By measurement of the  $O_2$  uptake in a washed liver protein-vanadium system, it was found that Mn, and to a lesser extent Co, inhibited the oxidation of phospholipide, whereas Ni, Fe, Ti and Cr were without effect. Further Mn and Co, as well as Ti, inhibited the oxidation by washed liver protein of cysteine to its sulphonic acid.—ALFRED EDEN.

GOETTSCHE, Marianne, LOUSTEIN, Ida, & HUTCHINSON, J. J. (1939). **Muscle Phosphorus in Nutritional Muscular Dystrophy in Rabbits.**—*J. biol. Chem.* **128**. 9-21. 3 figs., 2 tables. [Numerous refs.]

No striking changes in the muscle phosphorus fractions were observed until the muscles were severely degenerated. Dystrophic muscles which showed histological evidence of calcification were associated with an increase in total, total acid soluble and total inorganic orthophosphate phosphorus; those without calcified fibres, with a decrease in these constituents. There was a change in the phospholipide phosphorus fraction in normal and degenerated muscles. The phospho-creatine content of resting degenerated muscles was distinctly lower than normal, but its relationship to total acid soluble phosphorus remained the same.—R. A.

MORGULIS, S. (1938). **Nutritional Muscle Dystrophy.** pp. 94. 12 text figs., 12 figs. on 3 plates, 8 tables. [Numerous refs.] Paris: Hermann & Cie. [8vo] [4s.]

This monograph deals principally with biochemical studies in connexion with muscle dystrophy arising in rabbits on diets commonly regarded as deficient in vitamin E. Details are given of biochemical and physiological alterations in the metabolism of affected animals. Experiments were undertaken to elucidate the nature of the food deficiency responsible for the muscle dystrophy, and it appears to be clearly established that several separate factors are involved. This work confirms that one of the essential factors resides in the non-saponifiable fraction of wheat-germ oil and is possibly identical with the anti-sterility factor. Another factor which is water soluble evidently belongs to the vitamin B complex, possibly  $B_4$ , but its identity still remains to be established.—N. J. SCORGIE.

GROEN, Juda. (1938). **The Absorption of Glucose from the Small Intestine in Deficiency Disease.**—*N. Engl. J. Med.* **218**. 247-253. 1 fig., 2 tables. [Numerous refs.] [Abst. from abst. in *Lancet*. **235**. 735].

G. carried out *in vivo* experiments, using the methods of MILLER and ABBOTT [(1934). *Ann. intern. Med.* **8**. 85]. The absorption value in normal individuals has been shown to be 7-9 g. of glucose. G. found that two patients with scurvy had a normal absorption value, but patients suffering from organic diseases of the intestine, such as tuberculous enteritis, had greatly decreased values. Diminished values were also found in three cases of pernicious anaemia and in one of alcoholic polyneuritis with pellagra. This was shown by the conditions of the experiment to be due to defective capacity of the intestinal wall to absorb glucose, and not to unusually rapid passage of the intestinal contents.

MAC KAY, E. M., CARNE, H. O., & WICK, A. N. (1939). **Origin of Fasting Ketosis in the Rat Following a Diet Low in Choline and Protein.**—*Proc. Soc. exp. Biol., N.Y.* **41**. 40-41. 1 table. [4 refs.]

Diets containing variable concentrations of casein, and all containing 0.5% choline hydrochloride, were fed to four groups each of 5 adult male rats for a period of ten days before fasting was commenced. The data show that the higher the protein intake preceding the fasting period the lower was the resulting ketonuria. The maximum excretion of ketone bodies in the urine occurred on the third and fourth days of fasting.—R. ALLCROFT.

I. MILLER, M. W., & BEARSE, G. E. (1938). **The Cannibalism Preventing Properties of Oat Hulls.**—*Poult. Sci.* **17**. 466-471. 1 fig., 3 tables. [2 refs.]

H. BASS, C. C. (1939). **Control of "Nose-Picking" Form of Cannibalism in Young Closely Confined Quail Fed Raw Meat.**—*Proc. Soc. exp. Biol., N.Y.* **40**. 488-489.

I. White Leghorn pullets fed a yellow corn basal ration from the second to the thirty-second week of age developed cannibalistic habits which were prevented when this ration was supplemented with oat hulls, "oat mill feed" or replaced by an oat basal ration. Those given a supplement of "spruce dust" developed feather picking at about 14 weeks of age, but the condition practically disappeared at 32 weeks of age. Supplements of oat ash, oat hull ash or manganese sulphate failed to prevent picking.

II. A plentiful supply of raw meat given to young quail confined in brooders prevented "nose-picking". It was sometimes necessary to withhold all other food temporarily to force the birds to eat enough raw meat to prevent this form of cannibalism. Addition of dried meat-meal, fish-meal or milk products failed to prevent the trouble.—R. ALLCROFT.

THATCHER, H. S., SURE, B., & LEE, J. (1938). **Biochemistry and Pathology of Avitaminosis. II. Histopathology of Deficiency Diseases.**—*Bull. Ark. agric. Exp. Sta.* No. 356. pp. 48. 8 figs., 17 tables. [Numerous refs.]

The results of studies on microscopic changes observed in tissues of the albino rat on diets deficient in vitamin B complex, vitamin B<sub>1</sub>, vitamin B<sub>2</sub> [G] and vitamin A are presented and discussed.

The nursing young of rats on a diet deficient in vitamin B complex showed marked fatty deposition in the liver cells as well as atrophy of the spleen, haemorrhages in bone tissues and anhydraemia. Similar animals suffering from vitamin B<sub>1</sub> deficiency had a marked reduction in the glycogen content of the liver and

atrophy of the spleen as well as hypoglycaemia and anhydraemia, but no noteworthy fatty changes were seen in the liver.

The pathological changes observed in weaned rats deprived of the vitamin B complex were mainly those associated with inanition, although fatty infiltration of the liver cells was noted in a few cases. Atrophy of the spleen and hypertrophy of the adrenal glands and heart were the changes noted in weaned animals suffering from vitamin B<sub>1</sub> deficiency uncomplicated by inanition. Another significant result of specific vitamin B<sub>1</sub> deficiency was the production of gastric ulcers in some of the animals.

Microscopic examination of nerves from rats deficient in both vitamin B<sub>1</sub> and the vitamin B complex showed varying degrees of myelin degeneration, and in the later stages of the deficiency the axis cylinders were broken but no notable changes were observed in the C.N.S.

The main symptoms of vitamin B<sub>1</sub> [G] deficiency were cessation of growth, loss of weight and dermatitis; a seasonal variation was noted in the occurrence of the dermatitis. Since no correlation was found between loss of body weight and the onset of skin lesions, it was concluded that the anti-dermatitic and growth-promoting syndromes are not identical.

Pathological changes due to vitamin B<sub>2</sub> [G] deficiency were alopecia, ulceration of the skin, atrophy of the spleen and thymus, fatty changes of the liver and haemorrhages and congestion of the intestines.

Histological examination of tissues from rats on a diet deficient in vitamin A showed that metaplastic changes occurred in the posterior part of the tongue, in the salivary glands and in the respiratory and urinary tracts during the early stages of the deficiency and in a large proportion of animals with normal growth, some of which showed no external signs of A avitaminosis.—R. ALLCROFT.

PATTON, J. W. (1939). **Fright Disease an Avitaminosis.** *Vet Med.* **34.** 372-381. 3 figs. [Numerous refs.]

Symptoms of fright disease (canine hysteria) were produced in dogs by feeding them on a diet deficient in vitamin B<sub>1</sub>. In the first series of experiments seven adult dogs were fed on a commercial dog food which had been the diet of certain dogs that had contracted the disease, whilst in the second series six five-month-old puppies were fed on the same food after it had been autoclaved for 2 hours to destroy any vitamin B<sub>1</sub> present. All the experimental dogs received supplements of vitamins A, D and B<sub>2</sub> [G]. In the first series, anorexia, the classical first sign of B<sub>1</sub> deficiency, was noted in about 10 days, and within the next 72 hours all the dogs showed the characteristic nervous symptoms of fright disease. In the second series of dogs similar symptoms were manifested in less than half the time required in the first series. This is explained by the fact that the animals in the second series were young growing dogs and had therefore higher vitamin B<sub>1</sub> requirements; in addition these dogs were completely deprived of vitamin B<sub>1</sub> by autoclaving the food, while the older dogs possibly received some B<sub>1</sub> in the food, although an inadequate amount. The symptoms produced were more uniform in the second series, but in both cases they were considered to be those of pure vitamin B<sub>1</sub> deficiency without complications.

Further support to the thesis that absence of vitamin B<sub>1</sub> was the critical factor is given by the fact that after hypodermic injection of thiamin hydrochloride (vitamin B<sub>1</sub>) the dogs made spectacular recoveries. As a result of this finding, the treatment recommended for affected animals is the injection of 500 I.U. of thiamin hydrochloride (for young dogs weighing about 12 lbs.) daily for two or three days and a change to a diet adequate in vitamin B<sub>1</sub>. It was found that whilst 250 I.U. of

thiamin once daily ameliorated the symptoms it was insufficient for a cure in well-developed cases. In a general discussion P. stresses that fright disease is not new, and that its greater prevalence in recent years is probably accounted for by the more artificial types of food now commonly employed for dog feeding.—N. J. S.

BAUERNFEIND, J. C., & NORRIS, L. C. (1939). **The Antidermatosis Vitamin Required for Reproduction in the Domestic Fowl.**—*Science*. **89**. 416-417. 1 table. [5 refs.]

Four groups of hens were fed the following diets respectively :—(1) a normal diet containing all the vitamins known to be required by the domestic fowl ; (2) the same diet, except that the cereal portion and the liver extract were heated to destroy the antidermatosis vitamin—this was designated the heated diet ; (3) the heated diet + 5% whey adsorbate which contained the new growth and reproduction vitamin [see *V. B.* **9**. 257.], and (4) the heated diet + 5% whey adsorbate + 5% antidermatosis vitamin. The results showed that the average hatchability of the eggs of the hens fed the normal diet was 60% while that of the eggs of the hens fed the heated diet was 2.8%. No improvement in hatchability was obtained by addition of the whey adsorbate only to the heated diet, but the hatchability increased rapidly to 48% when 5% antidermatosis vitamin concentrate was also added. Observations on the development of dermatosis in chicks from the eggs of the hens in groups (1) and (2) showed that the eggs of hens fed the heated diet contained less of the antidermatosis vitamin than those of the hens fed the normal diet.

From the results it is concluded that the antidermatosis vitamin is required for hatchability or reproduction in the domestic fowl, but a lack of this vitamin did not affect egg production or mortality during the experimental period.—R. A.

DANN, W. J. (1938). **Animal Deficiency Diseases Related to Pellagra.**—*J. Amer. diet. Ass.* **14**. 157-167. [Copied *verbatim* from *Bull. Hyg., Lond.* **13**. 740. Signed D. C. H.]

A history of the unravelling of the vitamin B complex is given, the only part suitable for summary being the statement of the present position regarding vitamins B<sub>1</sub> and B<sub>2</sub> :—B<sub>1</sub> is the anti-neuritic factor. [Its constitution is known and it can be synthesized]. B<sub>2</sub> consists of—(a) Lactoflavin, essential to growth in rats and chicks, prevents dermatitis in turkey poult, cataract in rats and "yellow liver" in dogs. [Constitution known and can be synthesized]. (b) Nicotinic acid, cures human pellagra and blacktongue in dogs. [Constitution known and can be synthesized]. (c) The rat pellagra-preventing factor. (d) The chick pellagra-preventing factor, also essential for rat growth.

MORRIS, M. L., & FRANKLIN, C. E. (1939). **A Preliminary Report on the Use of Nicotinic Acid in the Treatment of Fusio-Spirochaetal Disease of Dogs.**—*N. Amer. Vet.* **20**. No. 6. 31-33. [8 refs.]

Administration of 20-50 mg. of nicotinic acid thrice weekly for a period of two weeks to dogs suffering from oral fusio-spirochaetal disease (Vincent's angina) greatly reduced the number of fusiform bacilli, cocci, and vibrios in the previously infected areas. Investigations showed that in some cases the fusio-spirochaetal infection was transmitted from man to the dog.—R. ALLCROFT.

UNNA, K. (1939). **Studies on the Toxicity and Pharmacology of Nicotinic Acid.**—*J. Pharmacol.* **65**. 95-103. 3 figs. [Numerous refs.]

Experimental evidence is presented demonstrating that prolonged oral administration of large amounts of sodium nicotinate (up to 2 g. per kg. body weight daily)

to chickens, rats and dogs over periods up to two months, failed to produce toxic symptoms or pathological changes of the organs. Acute toxicity of nicotinic acid in mice and rats ranged from 4.5 g. per kg. body weight after subcutaneous and from 5.7 g. per kg. body weight after oral administration. Nicotinic amide was found to be about twice as toxic.

The metabolism and the circulatory and respiratory systems of normal animals were not influenced by sodium nicotinate and nicotinic amide.—R. ALLCROFT.

DAY, P. L., DARBY, W. J., & COSGROVE, K. W. (1938). **The Arrest of Nutritional Cataract by the Use of Riboflavin.**—*J. Nutrit.* **15**. 83-90. 2 figs., 1 table. [4 refs.]

Young rats given a diet deficient in flavin developed nutritional cataract after an average interval of 52 days, the lesions reaching maturity in about a further 15 days. Intramuscular injections of riboflavin in doses of 120  $\gamma$  twice weekly were found to arrest the development of the cataract in 89.5% of cases if given in the early stages of the lesion. The authors conclude that their experiments furnish evidence that flavin is the cataract-preventing factor. [The type of cataract here described differs from that produced by lactose or galactose feeding].—N. J. S.

## PUBLIC HEALTH

— (1938). *Loi sur la production du lait alimentaire.* [**Portugal : Law for the Production of Milk**].—*Bol. pec., Lisboa*. **6**. 67-83. [In French].

Three designations of milk are recognized in Portugal :— (1) ordinary milk, *i.e.* milk produced from healthy cows and satisfying certain conditions relating to fat content, absence of colouring matter and pathogenic organisms, etc.; (2) pasteurized milk, *i.e.*, milk which after pasteurization satisfies the requirements relating to ordinary milk, and (3) special raw milk, *i.e.* milk which besides satisfying the requirements relating to ordinary milk, is produced under certain conditions specified by law. Cows intended for the production of milk in this last category must be previously approved and receive permanent veterinary attention. They must be housed away from densely populated areas, and there must be separate accommodation for milking. A cold storage room must be provided where milk may be kept at a temperature not exceeding 7°C., and the temperature during the sale and distribution of this milk must not exceed this figure. A sample of the milk produced each day is required to be kept for 24 hours. The personnel of the establishment must be healthy and be subject to regular medical attention.

All producers of milk must be licensed by the Municipal Veterinary Officer in accordance with instructions laid down by the Director General of Veterinary Services. Byres must conform with regulations regarding accommodation and structure. Cows whose milk appears constantly unfit for human consumption may not be used for milk production and, if not slaughtered, must be branded. Pasteurization centres are to be established throughout the country and at some future date the sale of unpasteurized milk, except the special raw milk, will be forbidden.—H. V. HUGHES.

FUCHS, A. W., & FRANK, L. C. (1938). **Milk Supplies and their Control in American Urban Communities of over 1,000 Population in 1936.**—*Publ. Hlth. Bull., Wash.* No. 245. pp. 69. 1 fig., 59 tables.

Data received in answer to questionnaires concerning the milk supplies and

their control are tabulated. Particulars are given of production, processing, consumption of milk, prices of the various grades, legal safeguards and the inspectorate employed.

Pasteurization was carried out in two thirds of the towns, its use increasing with expanding populations. In the larger towns, whilst tuberculin testing remained constant, testing for brucella infection decreased.

"Since 1923 progress in abortion testing has been phenomenal, in tuberculin testing extensive, particularly in the larger cities, and in pasteurization considerable, especially in the smaller municipalities. There is some reason to believe the abortion testing figures are too high."

99.4% of the entire milk supply was from tuberculin tested herds; 74.7% pasteurized; 74.1% both tuberculin tested and pasteurized; 35.2% from abortion free herds; 35% from both tuberculin tested and abortion free herds; 20.5% from abortion free herds and also pasteurized; whilst 20.3% of the entire milk supply was tuberculin tested, abortion free and pasteurized.—H. E. BYWATER.

MELLO, A., & MASTROFRANCISCO, N. (1938). Verificações sobre a presença do bacilo tuberculoso no leite da Capital. [**Detection of Tubercle Bacilli in Market Milk of São Paulo**].—*Rev. Industr. anim.* 1. No. 4. 25-42. 8 figs., 1 plate. [13 refs.] [English summary].

80 out of 100 samples taken at random from milk exposed for sale in São Paulo contained *Mycobact. tuberculosis*.

The authors note that the existing legislation, were it effective, would be sufficient to put a stop to such an insanitary state of affairs.—J. PASFIELD.

BOHN, J. D. (1939). **The Use and Value of the Phosphatase Test for Control of Pasteurization**.—*J. Amer. vet. med. Ass.* 94. 376-377.

The Scharer modification of the phosphatase test is simple and inexpensive and can be adopted for use in the field, thus making it possible to test before the milk is bottled. Field tests have a high educational value to the dairyman. The test can be used with slight modifications for butter, cheese, ice cream, etc.

The laboratory test takes one hour and will detect the presence of 0.1-0.01% of raw milk, whilst the field test can be completed in less than twenty minutes, and is capable of demonstrating the presence of 0.5% of raw milk. Details of the two tests are given.—H. E. BYWATER.

SHAUGHNESSY, H. J., & GRUBB, T. C. (1937). **The Incrimination of Milk and Milk Products in Staphylococcus Poisoning. Suggested Methods for the Investigation of Outbreaks**.—*Canad. publ. Hlth J.* 28. 229-234. [14 refs.]

All outbreaks of milk-borne staphylococcal food poisoning investigated by the authors originated from small herds supplying milk to small communities. In all instances cows with staphylococcal mastitis were found. The affected milk had a normal appearance and taste. Outbreaks did occur from supplies to large cities, probably due to bulking of milk and consequent dilution of the enterotoxin, which is relatively stable to heat and not destroyed by pasteurization.

Symptoms usually appeared 2-4 hours after consumption of affected milk, and this fact helps to distinguish staphylococcal from salmonella food poisoning, since in the latter the symptoms generally appear not less than 6 hours, and often as late as 24-48 hours, after ingestion. An individual immunity or tolerance to the toxin is not uncommon.

The authors state that the most reliable method of detecting food poisoning strains of staphylococci is to culture the organisms, under conditions favourable

to the development of the enterotoxin, and then to feed sterile filtrates to human volunteers with due precaution.—H. E. BYWATER.

VON OSTERTAG, R. (1938). Neuzzeitliche Fragen der Fleischbeschau. [**Modern Problems of Meat Inspection**].—*Z. Fleisch-u. Milchhyg.* **49**. 1-6, 21-23, 66-67, 81-82, and 101-103. [Numerous refs.]

A comment on recent German regulations concerning meat inspection is followed by a detailed discussion of problems still unsolved. Although the eradication of cysticercosis in swine has been very successful, cysticercosis in cattle is more frequent than ever before. The detection of *Taenia* carriers in man should be improved by premiums for every whole *Taenia* delivered, and it should be obligatory for treatment to be under medical supervision, ensuring that the parasites and their eggs are effectively destroyed. The number of *Taenia* carriers is appalling. Meadows and pastures should not be manured with human faeces. [It is not suggested that the custom of eating raw meat should be abandoned]. Echinococcosis has decreased in cattle and swine, but has increased in sheep. The inspection of sheep slaughtered on the farm and the periodical treatment of sheep dogs may lead to a decrease in the incidence of echinococcosis. Similar measures may lead to a complete disappearance of coenurosis.

Trichinosis in foxes seems to be more common than in swine; mice are a possible source of infection. Great losses are caused by confiscation of the meat of cryptorchid pigs because of the odour. All cryptorchids should undergo castration before the age of four months; eleven days after castration the meat will be odourless, but the odour takes ten weeks to disappear from the fat. The finding of vertebral tuberculosis in pigs makes an inspection of other bones necessary, and T.B. of one bone justifies a degradation of the meat quality. The tonsils of cattle and swine should always be inspected, but without making incisions, and removed as unfit for food. Attention is called to the spreading of *Brucella melitensis* infection in the eastern part of France.—V. CHLÁDEK (PRAGUE).

MATERNOWSKA, I. (1937). Działanie prądu elektrycznego na poszczególne komórki i tkanki zwierząt rzeźnych. [**Action of Electric Current on Particular Cells and on the Tissue of Slaughter Animals**].—*Hyg. Prod. Zwier.* **2**. 73-85. 6 figs. [8 refs.] [Suppl. to *Wiad. weteryn.* **16**.]

M. first observed the effect of the different types of current on particular cells. They affected not only the surface of the cells, but also the plasma. Alternating current had a more marked effect on plasma than direct current or intermittent direct current. The organs of electrically-stunned animals gave a more acid reaction than those of animals slaughtered without stunning. Unconsciousness lasted for 2-5 minutes after the cessation of the current. Nowadays alternating current is generally used. The following were found suitable in stunning:—for pigs, 70-80 volts, 0.5 amps, and 3,000-4,000 cycles per minute, for 20-30 seconds; for calves, 45 volts, 0.5 amps, and 3,000-4,000 cycles per minute, for 15-20 seconds; and for adult cattle, 20-60 volts, 0.5 amps; and 4,000-5,000 cycles per minute, for 15-30 seconds. Bleeding was more complete in animals killed after electrical stunning than in others not so stunned. The current used must be appropriate for the species; if the current is too heavy there may be "splashes" on the mucous and serous membranes. Hyperaemia of the spleen is sometimes found after electric stunning, which may lead to anthrax being suspected.—V. CHLÁDEK (PRAGUE).

SCHOOP, G., & LORENZEN, P. (1938). Anaerobier in der bakteriologischen Fleischbeschau. [**Anaerobes in Bacteriological Meat Inspection**].—*Dtsch. tierärztl. Wschr.* **46**. 209-215. 4 tables. [10 refs.]

According to German regulations pieces of muscle, spleen, kidney or liver from

suspected carcasses are put into dextrose agar or liver-broth media, the presence of anaerobes being judged by the gas formation. The authors investigated carcasses in this way, and in addition differentiated the organisms by Fortner's method. 779 carcasses were examined and 218 cultures of anaerobes were isolated. Other observations were made to determine the seat of infection, the extent of infection in slaughter animals and the influence of temperature on the organisms. In descending order of frequency, anaerobes were found in the liver, kidney, spleen and muscles.

Sheep are the most frequently affected, then cattle, calves, horses and pigs. Most of the anaerobic infections were found during July and August.

The anaerobes found are divided into three groups. Pathogenic types were present in 94 out of 218 cases, in which anaerobes found were *Clostridium welchii* in 64 cases, *Cl. septicum* in 21, and *Cl. oedematiens* in 9.

In 119 cases the anaerobes were non-pathogenic. Putrefactive non-pathogenic strain represented by *Cl. sporogenes* and *Cl. bifermentans* were present in 24% of cases in which anaerobes were present. Non-pathogenic, non-putrefactive anaerobes were found in 31% of cases (*Cl. amylobacter*, *Cl. sphenoides*, *Cl. multi-fermentans*, *Cl. tetanomorphus* and *Cl. lichenoides*).

Anaerobes were found mostly in carcasses in which there was disease of the genital tract of cattle and digestive tract of sheep, but sometimes also in those of cattle in which there was traumatic peritonitis and pericarditis.

The authors suggest that when pathogenic anaerobes are present the carcass is unfit for consumption and should be condemned. The putrefactive non-pathogenic anaerobes produce putrefaction and green discolouration of the tissues, and a foul odour, and the keeping quality of the meat is impaired; meat infected with such organisms should be condemned. Non-putrefactive, non-pathogenic anaerobes are the least dangerous, and in this case only the affected part of the carcass should be condemned.—M. F. BENJAMIN.

Boss, H. (1938). Untersuchungen über die unspezifische Agglutination (Spontan-agglutination) bei Bakterien der Intermedius-Gruppe mit besonderer Berücksichtigung der Agglutination auf dem Objektträger (Probeagglutination) bei der bakteriologischen Fleischschau. [Non-Specific Agglutination of Bacteria of the Intermediate Group (Coll-Salmonella) with Reference to the Rapid Agglutination Test in Meat Inspection].—*Inaug. Diss., Giessen*. pp. 56. 17. tables. [Numerous refs.]

In the routine examination of meat for food-poisoning bacteria of the salmonella group there are often found organisms which are intermediate between the salmonella and the coli groups. These bacteria give colonies on the differential media similar to those of the salmonella group, and when isolated they usually fail to ferment lactose, but differ from the salmonella group by fermentation of saccharose or the production of indol. [These bacteria often ferment lactose at a later date if incubated for a long time and are often spoken of as "late lactose fermenters"]. Such bacteria often show some agglutination by salmonella sera, especially if a slide method (*Objektträger*) is adopted.

B. has shown that salmonella bacteria, "intermediates" and *Bact. coli* are agglutinated by the slide technique and to low titres by the usual method, by normal horse serum, by a sample of swine erysipelas serum and a sample of anthrax serum, and to a much less extent by normal rabbit serum. [This is generally speaking in accordance with the distribution of normal agglutinins]. There were similar cross-agglutinations, all to very low titres, between salmonella bacteria and immune sera having no definite serological relationships. Ten strains of intermediate bacteria were isolated from meat in the routine examination and all strains were

studied by cultural and serological means. Nine strains were only agglutinated by salmonella sera to the low titres referred to; the other strain was agglutinated to high titres by a mixed *S. paratyphi-B* and by a mixed *S. typhi-murium* serum. These titres were obtained with suspensions containing "II" antigens.

It is pointed out that the titres obtaining with the intermediate group of bacteria are usually low, and that when reactions occur with the rapid method it may be necessary to defer judgement till they are tested by the tube method. The agglutinations are in the cases cited non-specific, for similar reactions are obtained with sera prepared against the swine corysipelas bacillus and the anthrax bacillus.

—R. LOVELL.

- I. DE KONING, K. (1936). Salmonellose der eend als oorzaak van voedselvergiftiging (consumptie-ijis) bij den mensch. [**Salmonella Infection in Ducks as the Cause of Food Poisoning in Man**].—*Antonie van Leeuwenhoek ned. Tijdschr. Hyg. Microbiol.* **3**. 238-240.
- II. JANSEN, J. (1936). Salmonellose der eend als oorzaak van voedselvergiftiging (consumptie-ijis) bij den mensch. [**Salmonella Infection in Ducks as Cause of Food Poisoning in Man**].—*Ibid.* 241-243.

I. Investigations in an instance of food poisoning involving some 60 persons after eating ice-cream in 1936 are claimed to have shown that raw ducks' eggs coming from a neighbouring farm had been used in the preparation of the ice-cream. Of the 25 laying ducks on that farm, 22 reacted positively to the agglutination test with *Salmonella typhi-murium*, and also an organism which was cultured from the yolk of their eggs was agglutinated by *S. typhi-murium* antiserum. A paratyphoid organism of the *typhi-murium* type was isolated from the faeces of the patients.

II. Bacteriological studies of the bacillus isolated by DE KONING from ducks' eggs [see I] are stated to have shown that it is a strain of *Salmonella typhi-murium* which does not ferment rhamnose. All the ducks on the infected farm were killed, and on autopsy many of them were found to be affected with oophoritis typical of salmonella infection, and isolations from their ovaries yielded an organism identical in all its characteristics with that found in the egg.

## THERAPEUTICS

- I. FINKELSTEIN, R., & BIRKELAND, J. M. (1938). The Mode of Action of Sulfanilamide and Prontosil.—*Science*. **87**. 441-442. 1 table. [4 refs.]
- II. MAEGRAITH, B. G., & VOLLUM, R. L. (1938). The Bacteriostatic Effects of Sulphonamide-P, Soluseptasine, and M & B 693.—*Brit med. J.* Nov. 12th. 985-986. 3 tables. [5 refs.]
- III. WHITE, H. J., & PARKER, J. M. (1938). The Bactericidal Effect of Sulfanilamide Upon Beta Hemolytic Streptococci in Vitro.—*J. Bact.* **36**. 481-498. 5 tables, 4 charts. [17 refs.]
- IV. GREEN, D. F., ALLISON, J. B., & MORRIS, M. L. (1938). The Renal Excretion of Sulfanilamide in Dogs.—*J. Pharmacol.* **64**. 263-270. 3 figs., 1 table. [9 refs.]
- V. LABELLE, G. (1938). Sulfanilamide in Veterinary Therapeutics.—*Vet. Med.* **33**. 488-489.
- VI. PADE, H. (1938). Prontosil in der Veterinärmedizin. [**Use of Prontosil in Veterinary Medicine**].—*Vet. med. Nachr.* Nos. 4 & 5. pp. 89-100. [19 refs.]

I. Various dilutions of sulphanilamide or of prontosil were added to agglutination tubes containing suspensions of streptococci and g. pig's leucocytes mixed

with plasma; the mixtures were incubated for 80 minutes, then smears were made and examined. The greatest degree of phagocytosis occurred in the tubes containing dilutions of sulphanilamide and of prontosil between 1:50,000 and 1:100,000; the percentage of cells taking part in the reaction showed a marked increase over that of the controls. Evidence was obtained that serum, or a factor in it, is necessary to obtain this effect of the drugs. Osgood [(1938). *J. Amer. Med. Ass.* **110**. 349.] has recently obtained similar results and concludes that increased phagocytosis is due to a neutralization of the bacterial toxins by the drug, which has no direct action on either the leucocytes or the bacteria.

II. All these drugs inhibit the growth of *Streptococcus viridans*, M & B 693 being the most effective. They are all ineffective in the absence of leucocytes. Soluseptasine inhibits the growth of *Neisseria gonorrhoeae* in the absence of leucocytes. All the drugs are effective against *N. meningitidis*; M & B 693 is the most effective and is active even in the absence of blood. It is suggested that M & B 693 may prove the most useful therapeutic agent in cerebrospinal fever, and in conditions arising from infections with *Str. viridans*, while soluseptasine seems the most satisfactory for dealing with *N. gonorrhoeae*.

III. Bactericidal action upon 36 strains of beta-haemolytic streptococci recently isolated from human infections has been demonstrated with 20 mg. % sulphanilamide *in vitro* at 40°C. in peptone-glucose broth and in whole blood. This streptococcicidal action can also be demonstrated *in vitro* with lower concentrations of sulphanilamide. Bactericidal action due to sulphanilamide could not be demonstrated at test temperatures lower than 39°C. Experimental evidence indicates that the action of sulphanilamide *in vitro* is delayed for at least three hours.

IV. The sulphanilamide clearance was found to be about 36% of the urea clearance and 20% of the creatinine clearance in a dog with normal renal function. The sulphanilamide clearance is lowered when the urea clearance is reduced by kidney damage, but the sulphanilamide-urea clearance ratio tends to increase when there is any lowering in the urea clearance. It is suggested that this ratio may be used to indicate kidney damage, as well as to give more information concerning kidney function. Dosage should be based upon maintenance of the blood sulphanilamide level rather than upon body weight.

V. Sulphanilamide cured 95% of cases of polyarthritis, septicaemia and omphalophlebitis in new-born foals. The dosage should start at 5 g. on the first day, decreasing to 1 g. on the fifth day; the drug is administered with an equal quantity of sodium bicarbonate in mare's milk. In large animals the dosage starts at 40 g. per day, decreasing to 8 g. on the fifth day. It is stated that encouraging results were obtained in cases of glanders, influenza, mastitis, traumata, arthritis, septicaemia following surgical intervention, metritis, pneumonia, white scour of calves, etc. [No details are given and bare statements concerning cures of certain affections must be read with reserve.]

VI. The use of prontosil in infectious catarrh and infectious angina of the horse is said to prevent secondary infections; in strangles the drug is said to prevent streptococcal complications. Satisfactory results have been obtained in the treatment of petechial fever. In dogs and cats the drug has been used in the treatment of vaginitis, endometritis, infections of the respiratory and gastro-intestinal tracts, and infected wounds. The dose is 0.75-8 c.c. of a 5% solution given daily intramuscularly. No satisfactory results have been obtained in the treatment of pyogenic mastitis. Good results were said to have been obtained in the treatment of bovine broncho-pneumonia. Treatment with prontosil is said to produce improvement in *Bact. coli* and *Streptococcus pyogenes* infections, and in puerperal fever in cattle.—J. M. ROBSON.

- I. McINTOSH, J., & WHITBY, L. E. H. (1939). **The Mode of Action of Drugs of the Sulphonamide Group.**—*Lancet*. 236. 431-435. 5 tables. [10 refs.]
- II. TUNNICLIFF, Ruth. (1939). **The Action of Prontosil-Soluble and Sulphanilamide on the Phagocytic Activity of Leukocytes and on the Dissociation of Streptococci.**—*J. infect. Dis.* 64. 59-65. 2 figs., 1 table. [13 refs.]

I. Sulphonamide drugs do not stimulate leucocytic or phagocytic activity. They do not affect the speed of production, or the quantity or quality of specific immune bodies. Both *in vitro* and *in vivo* the drugs are not instantly active, and there is a lag of several hours before their effects develop. There is a quantitative relationship between the effective dose of the drug and the number of bacteria affected. Sulphonamide drugs are active on highly virulent organisms and on those in the logarithmic phase of multiplication; they are inactive on "rough" organisms. The drugs are not simple germicides; they probably act by neutralization of some metabolic function or enzymic activity.

II. Prontosil-soluble diluted from 1:1,000-1:1,000,000 and sulphanilamide diluted 1:100,000-1:2,000,000 in salt solution promote phagocytosis of *viridans* type and haemolytic streptococci. Both preparations appear to stimulate the activity of leucocytes but they do not act as opsonin. A 1:1,000 solution of prontosil-soluble and a 1:1,000,000 solution of sulphanilamide promote phagocytosis of streptococci in pus. Both prontosil-soluble and sulphanilamide injected subcutaneously into mice in amounts which give approximately the same blood levels of free sulphanilamide appear to stimulate the activity of leucocytes to the same degree.—J. M. ROBSON.

- I. DELIDIMITRIOU, G. (1938). Note sur le traitement de la trypanosomiase à congolense par le surfen C. Bayer. [**Treatment of Trypanosoma congolense Infection in Cattle with Surfen C**].—*Ann. Soc. belge Méd. trop.* 18. 539-542. 1 table.
- II. VAN SACEGHEM, R. (1938). Note sur le traitement des trypanosomiasés par le Surfen C chez les bovidés. [**Treatment of Bovine Trypanosomiasis with Surfen C**].—*Ibid.* 699-703. [4 refs.]

I. D. treated 270 bovine cases of *Tryp. congolense* infection with a single intramuscular injection of 100 c.c. of 2.5% Surfen C, and on examining blood smears one to six months later saw trypanosomes in only 28. The drug is therefore very efficacious. It does not begin to act for one or two days after injection. The subcutaneous route was tried without untoward results in two cattle, but the intravenous route is dangerous.

II. The author has had experience similar to D.'s and comes to the same conclusions. He states further that Surfen C is effective also against *Tryp. vivax*. —J. E.

- I. VAN DEN BRANDEN, F. (1938). Étude de l'action des vapeurs de "Bayer" 205 sur le rat blanc infecté de trypanosome "Brucei". [**Action of Fumes of Bayer 205 on White Rats Infected with Tryp. brucei**].—*Ann. Soc. belge Méd. trop.* 18. 515-522. [2 refs.]
  - II. VAN DEN BRANDEN, F. Recherche sur l'action de l'astreptine Meurice (P-aminophénol-sulfonamide) sur le Trypanosoma "brucei". [**Action of Astreptin (Sulphanilamide) on Tryp. brucei**].—*Ibid.* 698-694.
  - III. VAN DEN BRANDEN, F. (1938). Le sulfate d'ortho-oxy-quinoléine (chinosol-sunoxol) a-t-il une action in vivo sur des rats blancs infectés de Trypanosoma "brucei"? [**Action in vivo of Sulphate of Ortho-oxyquinoline (Chinosol-Sunoxol) on White Rats Infected with Tryp. brucei**].—*Ibid.* 695-698. [1 ref.]
- I. Rats infected with *Tryp. brucei* and placed immediately in a glass jar into

which a vapour of "Bayer 205" was forced did not develop infection, but it was not possible to cure by this means rats already infected.

II. Tests on five infected rats with one to three doses of astreptine (10-30 cg.) showed that it has no trypanocidal action on *Tryp. brucei*.

III. This drug was also found inactive against *Tryp. brucei* infection in white rats, though it had some action *in vitro*.—J. E.

VIERTHALER, R. W., & BOSELLI, A. (1939). Die Bedeutung kleinster Germaninmengen im Kaninchenblut als Schutz gegen eine Infektion mit *Trypanosoma brucei*. [Value of Very Small Amounts of Germanin in Rabbit Blood as Protection Against an Infection with *Tryp. brucei*].—*Arch. Schiffs- u. Tropenhyg.* **43**. 149-160. 5 figs., 11 tables. [7 refs.]

The first part of the paper deals with the technique of estimating germanin in blood, the method of DANGERFIELD, GAUNT and WORMALL [(1938) *Biol. J.* **32**. 59.] being used. The smallest protective blood concentration of the drug which would protect rabbits against a single injection of a highly virulent strain of *Tryp. brucei* was then determined by experiments with graded doses. It was found that a concentration of 1.8 mg. per 100 c.c. of blood was effective.—J. E.

I. VAN DEN BRANDEN, F., & POTTIER, R. (1938). Essais de perfectionnement du contrôle biologique des glyphénarsines (Tryparsamide, Tryponarsyl, Novatoxyl, Tryprothane). [Attempts to Improve the Biological Control of Glyphenarsins].—*Ann. Soc. belge Méd. trop.* **18**. 299-311. 1 fig., 5 tables. [11 refs.]

II. VAN DEN BRANDEN, F. (1938). Over de biologische proef van "Bayer" 205 of Germanine en gelijksoortige produkten: 309 "Fourneau" of Moranyl en Belganyl. [Biological Tests of Bayer 205].—*Ibid.* 687-692. [In Dutch: French summary].

I. The authors propose the following method of biological standardization (standardization of toxicity) of the drugs named. (1) *Rabbit test*. Five similar rabbits of 1,750-2,250 g. to be given, after 15 days' careful observation, 1 g. per kg. body weight, diluted 1:10 in distilled water sterilized by boiling, and slowly injected warm into the ear vein: not more than two of the rabbits ought to die within seven days. (2) *White mouse test*. Ten white mice of 20 g. to be injected subcutaneously with 0.09 g. of the drug (diluted and sterilized as above): six mice ought to survive beyond ten days and not more than four ought to suffer "crises nerveuses".

II. The author suggests the following biological method for the standardization of naganol. (1) *Toxicity test*. Eight white mice of 20 g. to be given subcut. 1.5 cg. of the drug in 1 c.c. of physiological saline: six out of eight of the mice should survive over 15 days. (2) *Therapeutic test*. Eight white mice of 20 g., infected by *Trypanosoma brucei* (Congo strain) to be given 0.1 mg. of naganol in 1 c.c. of physiological saline 24 or 36 hours later: six of the eight animals ought to be cured and free from infection by the 20th day.—J. E.

ENDREJAT, E. (1939). Die Beschalseuche und ihre Behandlung. [Dourine and Its Treatment].—*Dtsch. tierärztl. Wschr.* **47**. 261-263.

After a brief review of dourine as it occurs in Iran, E. gives histories of 13 cases treated with naganol. Good results are claimed even for cases in which emaciation and paralysis were already marked. Eleven cases appeared to recover completely, but had not been observed long enough to preclude the possibility of relapse. [No facilities existed for conducting serological tests—see *V. B.* **5**. 803].

Laminitis was often a complication of repeated dosage with naganol; where this occurred antimosan was substituted for naganol until the laminitis was cured, when naganol was again used. The initial intravenous dose of 4-5 g. of naganol usually produced a marked reaction. Subsequent doses were of 2-4 g. at intervals of a few days to a week or so, depending on the condition of the patient. A total of 11 g. was usually necessary; 17 g. were used in one case.

The method is proving useful in a country where control by veterinary police measures are impracticable.—H. E. HARBOUR.

LAUNOY, L., & LAGODSKY, H. (1938). Étude de la stibio-résistance, secondaire à l'arséno-résistance, acquise par *Trypanosoma annamense*. [**Resistance of *Tryp. annamense* to Antimony Secondary to Resistance to Arsenic**].—*Bull. Soc. Path. exot.* **31**. 866-876. 6 tables. [7 refs.]

The authors found that *Tryp. annamense* developed resistance to antimony compounds when infected rabbits were treated with tryparsamide; this was also the case when the mouse was the host.—M. L. BINGHAM.

WIRTH, D., & LANGER, H. (1937). Atoxyl bei Geflügelspirochätose. [**Treatment of Fowl Spirochaetosis with Atoxyl**].—*Wien. tierärztl. Mschr.* **24**. 203-205. [4 refs.]

Among fowls affected with spirochaetosis, there was a mortality of 50% after treatment with atoxyl in doses of 0.05 g. per kg. body weight of a freshly prepared solution given intramuscularly. P.M. there was severe visceral gout in all cases. Experiments with fowls affected experimentally with visceral gout confirmed the suspicion that atoxyl is contra-indicated in cases of this disease because its administration is followed by a severe intoxication.—V. CHLÁDEK (PRAGUE).

MACLEOD, J. (1938). On the Protection of Sheep from Maggot-Fly.—*Bull. ent. Res.* **29**. 149-163. 1 fig., 7 tables. [6 refs.]

The chemical protection of sheep against maggot flies may be achieved in various ways and this subject is considered in detail. Owing to a number of difficulties, the normal type of field trial is regarded as unsatisfactory for the testing of protective dips and sprays. Experimental methods are described for assessing the repellent, ovicidal and larvicidal properties of chemicals and the duration of their effect in the fleece. The limitations of these tests are discussed and it is suggested that they should be supplemented by large scale field tests under natural conditions. The results obtained with certain proprietary dips are described. Carbolic dips neither repel the fly nor prevent the establishment of artificial strike on the skin; cresylic acid, incorporated in a mineral oil base, proved ineffective in these respects. Arsenic dips protect sheep against artificial strike for about four weeks under winter conditions. Soluble arsenic persists in the fleece and appears to be only slightly affected by heavy rain, since a dip consisting entirely of soluble arsenic gave good protection during rainy weather.—R. P. H.

BAUDET, E. A. R. F. (1937). Over het gebruik van demalen *Lonchocarpus* wortel bij de runderhorzelbestrijding. [**Lonchocarpus Root Powder as an Ox Warble Larvicide**].—*Tijdschr. Diergeneesk.* **64**. 1033-1037. [English, French and German summaries].

B. found that a wash prepared with one part powdered *Lonchocarpus* root in thirty parts water was slightly less effective in destroying the larvae of the ox-warble fly infesting calves than a derris powder wash of the same concentration. It is stated that it is easier to assess the quality of derris than of the *Lonchocarpus* root.

SANNIER, A. (1987). Contribution à l'étude du pouvoir acaricide des crésols. [**Acaricidal Power of Cresols**].—*Thesis, Alfort*. pp. 98. 24 tables. [Numerous refs.]

Details are given of experiments in which, of all the preparations tested, including arsenicals and mercurials, cresols appeared to be the most effective for killing the parasites *in vitro*. Methods of treatment are discussed.

EHLERS. (1988). Beitrag zur Bekämpfung der Pferdeläuse in den Truppenpferdebeständen unter besonderer Berücksichtigung des "Derrilavols". [**Control of Lice in Army Horses, with Special Reference to "Derrilavol"**].—*Z. Veterinärk.* 50. 496-506. 2 tables. [Numerous refs.]

A 0.8% solution of "derrilavol" in soft water (with an addition of soft soap) killed lice in 80 minutes, but for general use a 0.6% solution was adopted.

LEHMKE, H. (1988). Versuche zur Behebung der Sterilität bei Rindern und Stuten durch "Enoulan"-Öl (Weizenkeimöl). [**Treatment of Bovine and Equine Sterility with a Vitamin E Preparation, "Enoulan"**].—*Berl. tierärztl. Wschr.* June 24th. 367-369. 1 table.

"Enoulan" wheat germ oil containing vitamin E [the amount is not stated], was injected intramuscularly within three days of the beginning of oestrus into animals affected with sterility; this was only done when the genital organs (except the ovaries) showed no inflammatory or anatomical changes. Pregnancy was obtained in 3 out of 5 cows, and one mare, with irregular oestrus; in 4 out of 6 mares with anoestrus; in 28 out of 80 cows and 2 out of 4 mares, in which there was normal oestrus and no changes in the generative organs, but which had never become pregnant, and in 6 out of 8 cows and one mare which had changes in the ovaries.—A. W. MÖLLER.

## POISONS AND POISONING

- I. FARGO, J. M., BOHSTEDT, G., PHILLIPS, P. H., & HART, E. B. (1988). **The Effect of Fluorine in Rock Phosphate on Growth and Reproduction in Swine**.—*Proc. 31st ann. Meet. Amer. Soc. anim. Prod.* 1938. pp. 122-125.
- II. VELU, H., & CHARNOT, A. (1988). Données nouvelles sur l'étiologie et la pathogénie du darmous. [**The Causation and Pathogenesis of Darmous**].—*Bull. Inst. Hyg. Maroc*. Nos. 1-2. pp. 5-26. 3 figs., 6 plates. [2 refs.]
- III. MACHLE, W., SCOTT, E. W., & TREON, J. (1989). **Normal Urinary Fluorine Excretion and the Fluorine Content of Food and Water**.—*Amer. J. Hyg.* Sect. A. 29. 189-145. 6 tables. [8 refs.]

I. Pigs fed on adequately balanced rations supplemented with various levels of rock phosphate (containing about 3.6% F) were studied from the aspect of live weight gains and effect on reproduction over three generations. Teeth changes were found in brood sows at the lowest level of 0.4% rock phosphate, and 0.8% levels were unsatisfactory for breeding stock although the ill-effects were not noticeable until the suckling period, during which the sows did not eat enough adequately to suckle their young. Growth rates were lowered and food consumption per lb. live-weight gain was increased at this level. Unsatisfactory live weight gains and impairment of suckling and reproductive ability were evidenced at a 1.6% level, although in all cases feeding on green food raised the F tolerance, which appears to be higher in swine than in cattle.

II. The authors continued their investigations into the aetiology and pathogenesis of darmous [see *V. B.* 2. 509]. In contrast with  $\text{NaF}$ ,  $\text{CaF}_2$  does not dissolve in sufficient quantity in water to cause dental lesions in sheep. Sheep normally do not eat soil voluntarily and therefore geophagia cannot be incriminated as a cause of darmous. Analysis of the stomach contents of sheep in the darmous area shows that normally only traces of F are found but during the dry season the F content of the gut rises very considerably, approximating to that of the dry vegetation, and this latter, whether as hay, straw or grain, is the medium by which the F is taken into the animal, and so causes the disease. The F content is still further increased by the presence of dust on the vegetation. This F intoxication is thus seasonal and intermittent, being insignificant in the wet season, which may last three to nine months, and very intense during the dry season. Dental lesions seem only to be produced after several months of prolonged F intoxication, and the teeth of sheep can undergo their whole evolution in this time without being affected. On the other hand serious lesions can appear a considerable time after the F ingestion has been stopped. The authors conclude by stating that the dental condition, darmous, following upon intermittent seasonal ingestion of F from dry forage, even when washed free of the dust of these phosphatic areas (with which the F is associated), only appears slowly, long after the beginning of the intoxication of which the actual mechanism escapes observation at the time. The complete elucidation of this problem is important because of the interest it seems to show for the study of the pathology and physiology of bone.

III. Representative food-stuffs in Cincinnati were found to contain less than 1.7 p.p.m. F where the natural water contained less than 0.1 p.p.m., and the food is considered responsible for the 1 p.p.m. F found in human urine in this area. In parts of Arizona where "mottled teeth" is endemic the water contains up to 18 p.p.m. F, but the F in the foodstuffs was again low, bearing no obvious relation to that of the water. Urine samples from these areas showed figures much above 1 p.p.m., and although the number of samples analysed was small there tended to be a positive correlation between the level of F excretion and the amount of F in the drinking water.—ALFRED EDEN.

SCHULZ, J. A. (1988). **Fluorine Toxicosis in the Albino Rat.**—*Res. Bull. Iowa agric. Exp. Sta.* No. 247. pp. 242. 1 fig., 28 tables. [Numerous refs.]

Mineral mixtures were fed to cattle in the corn belt largely as supplements, the basal ingredients being bone-meal and limestone. As the price of bone-meal mounted rock phosphate was substituted up to 75% in some mixtures. These proved injurious to stock, and assuming that fluorine in the rock phosphate initiated the toxic symptoms, S. attempted to establish the lower limits of toxicity of the fluorides and to find out what factors ameliorated or intensified this toxicity. While injuries to the bones and teeth are early manifestations of F intake, interference with reproduction, growth, and milk production followed long-continued feeding. For convenience white rats were used in the experiments.

$\text{NaF}$  fed at the level of 0.01% of the ration caused flaking and mottling of the enamel of incisor teeth. At 0.025% slight inhibition of growth in successive generations was noted, but was more marked at a 0.05% level, the incisor teeth becoming elongated and chalky and reproduction less certain. At levels of 0.10% and 0.15% reproduction was uncertain, growth was stunted, and the incisors formed complete circles outside the jaw or cut through the jaw if not clipped. At 0.20% and 0.25% levels death followed in a few weeks. Bone analysis showed increase in fluoride and Mg and a decrease in  $\text{CO}_2$ . The percentage Ca and P was changed in young rats but unaffected in adults. Bone composition changes

were restored by normal feeding. The toxicity of NaF was accentuated by low Ca and ameliorated by high Ca in the ration. Cod-liver oil reduced the effect of NaF.

CaF<sub>2</sub> was much less toxic than NaF but produced the same changes when fed at sufficiently high levels. F in rock phosphate was nearly as toxic as NaF. The F in phosphate limestone as used in the experiments was less toxic than that present in rock phosphate, probably owing to the increase in the Ca/P ratio and alkalinity. The residual F in acid (super) phosphate was less toxic than that in rock phosphate, the toxicity approximating that of CaF<sub>2</sub>.

S. found it difficult to say at what stage incipient fluorosis became truly toxic fluorosis, and since it was impossible to assess the borderline toxicities in farm animals as evidenced by the mottling of incisor teeth in rats, it was not advisable to suggest any apparently safe levels at which any of the earthy phosphates might be fed.—R. BAMFORD.

OTTO. (1938). Bleivergiftungen bei Pferden und ihre Bedeutung für den Truppen-veterinär. [**Importance of Lead Poisoning in Horses in Military Veterinary Work**].—*Z. Veterinärk.* 50. 554-568. [Numerous refs.]

Danger from poisoning comes from lead mines (smoke, dust, and waste water), drinking from rivers containing lead, from the assimilation of lead paint, and drinking from newly-constructed or damaged water supplies, when the water is "lead solvent".

The symptomatology of lead poisoning is discussed, together with the effects on the tissues and organs.—V. CHLÁDEK (PRAGUE).

VIANELLO, G. (1939). Considerazioni sull'avvelenamento dei vitelli per ingestione di vernice a minio (Pb<sub>3</sub>O<sub>3</sub>). [**Polsoning of Calves by Paint Containing Red Lead**].—*Clin. vet., Milano.* 62. 39-42. [1 ref.]

V. states that recent observations lead him to believe that the danger to calves of paint containing red lead is not sufficiently realized, and that deaths due to this poison are frequently attributed to other causes.

HYKEŠ, O. V., & DIAKOV, F. A. (1936). Antagonistický účinek jodových solí na toxicitu octanu thallného a jím vyvolanou alopecii. [**Antagonistic Effects of Iodides in Poisoning and Baldness in Rats due to Thallium Acetate**].—*Biol. Spis. vys. Šk. Zvěrolék.* 15. [29]-[47]. 1 table. [Numerous refs.] [English summary].

Subcutaneous administration of iodides considerably reduces the toxicity of thallium acetate for rats. There is a marked reduction in mortality, weakening or almost complete disappearance of toxic symptoms, including alopecia, and inhibition of the development of cataract and other resultant eye lesions. It was found that the strongest action was obtained with potassium or lithium iodide; the results with sodium and magnesium iodides were less satisfactory. Calcium iodide would probably have the same biological action as the other iodides in this experiment, but because of the deleterious effect upon the skin of the calcium ion it cannot be used subcutaneously in practical therapy. The iodine acts as an antidote to thallium only if the ratio between thallium received *per os* and iodine given subcutaneously is at least 1:30.—E. PŘIBYL (BRNO).

ANON. (1937). **Selenium Problems in South Dakota.** pp. 80. 6 figs., 4 tables. [Numerous refs.] Brookings, S. Dakota: State Planning Board [4to] [Mimeographed].

This report is in the nature of a review article on the Se problem, much of the literature on which has already been abstracted in this *Bulletin*. It deals with the early views on "alkali disease", the incrimination of Se as the causal agent, and a general account of the chemical, geological and geographical distribution of Se in South Dakota. The absorption of Se by vegetation and the so-called "converter plants" is described, and the effect of Se upon the animal body, including accounts of the poison springs of the area, is dealt with thoroughly. Finally the Se problem is discussed in relation to public health, reference being made to obscure disorders amongst inhabitants of the area. As a full and comprehensive review of the knowledge of the Se problem up to 1937 this report will repay ample perusal.—ALFRED EDEN.

FRANKE, K. W., & PAINTER, E. P. (1938). **A New Toxicant Occurring Naturally in Certain Samples of Plant Food-Stuffs.—XVIII. A Study of the Toxicity and Selenium Content of Seleniferous Diets : With Statistical Consideration.**—*Cereal Chem.* **15**. 1-24. 3 figs., 4 tables. [Numerous refs.] [Copied from abst. in *Exp. Sta. Rec.* **79**. 667].

In a further report the results of numerous rat-feeding trials, involving a total of 38 seleniferous diets and 382 experimental animals, are summarized. The sources of Se in the various rations include sodium selenate, and that naturally occurring in wheat, corn, barley and emmer.

A high degree of correlation was found between the toxicity and the Se content of the various rations, although Se from different sources varied in toxicity. Considering Se as the sole toxicant in the cereals fed, the relative toxicity of this element in the different diets ranked in the following order:—wheat, corn, barley, selenate, and selenite. Over 10 p.p.m. of naturally occurring Se in the diets invariably resulted in pronounced restriction of food consumption, and in practically all cases 9 p.p.m. caused death in the young animals. A concentration of less than 5 p.p.m. prevented normal growth, and the gain per g. of diet consumed was less on seleniferous than on normal diets. Females were slightly less susceptible to Se poisoning than males, and the toxic effect seemed to depend more on the concentration of selenium in the diet than on the amount actually ingested daily. There was some evidence that the toxicity of grains decreased during prolonged storage.

FINNER, Lucy L., & CALVERY, H. O. (1939). **Pathologic Changes in Rats and Dogs Fed Diets Containing Lead and Arsenic Compounds. Compounds Used : Lead Arsenate, Arsenic Trioxide, Calcium Arsenate and Lead Acetate.**—*Arch. Path.* **27**. 438-446. 3 figs., 2 tables. [8 refs.]

The results obtained from a microscopic examination of the blood, viscera and skeletal tissues of four groups each of four pairs of rats, and one group of 29 dogs are reported and show that under the conditions of the experiments, injuries of tissues were caused by both lead and arsenic. The most marked histological changes were produced in the kidneys. The ingestion of lead even at very low levels caused the most severe injuries to the tissues; some dogs fed as little as 0.33 mg. of lead per kg. body weight per day died before scheduled termination of the experiment.

Details of a special technique for microscopic examination of the tissues of the lead-treated animals are given. The history of the animals in the various groups and the data on their nutritional, chemical and therapeutic status are published elsewhere.—R. ALLCROFT.

KUSCHER, A. (1938). Karbidvergiftung bei Hühnern. [**Carbide Poisoning of Fowls**].—*Wien. tierärztl. Mschr.* 25. 692-693. [4 refs.]

An account of illness, followed by recovery, in 15 hens that ate carbide thrown on to a refuse heap.—SASSENHOFF (MUNICH).

WEIDENMÜLLER, H. (1938). Toxikologische Untersuchung einiger quecksilberhaltiger Saatbeizmittel. [**Toxicological Tests of Mercury Preparations Used as Preservatives of Seeds**].—*Berl. Münch. tierärztl. Wschr.* September 9th. 543-546. [Numerous refs.]

In order to preserve grain from attack by moulds, it is sometimes treated with chemical compounds. Three organic mercury preparations in powder form used for this purpose were tested for their action on the skin and respiratory system of rabbits. Rabbits were subjected on alternate days for 18 days to the action of this preparation when administered as a cloud of dust. They reacted by coughing and sneezing, but did not suffer any other ill-effects. To observe the effect on the skin the preparations were rubbed at three day intervals into patches of skin, both shaven and unshaven. No local irritant action followed, but the animals died after about 5-11 days from acute mercury poisoning. This shows that these preparations are potentially dangerous.—SASSENHOFF (MUNICH).

PARREE, W. (1937). Mededeeling over den stand van het vraagstuk "gasbescherming van paarden" in het K.N.I.L. [**Protection of Horses from Poison Gas**].—*Ned.-ind. Bl. Diergeneesk.* 49. 263-276. 3 figs.

In experiments carried out in Holland horses were found to be at least as susceptible as man to the effects of mustard gas, with the difference, however, that instead of causing blisters the gas produced necrosis in the skin. The feet and hoofs were found to be sufficiently protected from the gas by the thick hair and horny layers. Tear and nose-irritant gases appeared to have very little effect on the horses. The technical difficulties inherent in the construction of a satisfactory gas mask for horses are briefly discussed.

## PHYSIOLOGY

DEL RIO-HORTEGA, P. (1939). **The Microglia**.—*Lancet*. 236. 1023-1026.

The microglia, although not a part of the fundamental architecture of all nerve tissue, is described as a regular constituent. Mesodermal in origin from meningeal polyblasts, the microglia cells soon become distributed through the body, where they take on the specific function of phagocytosis in all nerve centres. In health they remove the products of normal metabolism, while in disease they rapidly migrate to the seat of injury and assist in removing the products of disintegration. The macroglia—astrocytes and oligodendrocytes—are ectodermal in origin and have no phagocytic activities.—C. W. OTTAWAY.

LANDSBERG, J. W. (1939). **The Blood Picture of Young, Normal Dogs**.—*J. Amer. vet. med. Ass.* 94. 595-600. 4 figs., 4 tables. [13 refs.]

Blood samples from 95 worm-free dogs (88 male and 57 female) of an average age of 102 days and weight of 4.5 kg. were taken to determine the complete haematological picture in young, normal dogs. Samples were obtained by cardiac puncture. The average counts per c.mm. were as follows:—erythrocytes, 5,004 millions with a concentration of 8.92 g. haemoglobin and a volume of 37.82 c.c. packed erythrocytes per 100 c.c.; total leucocytes, 11,895, and thrombocytes, 154,879. The

mean reticulocyte count on 45 animals (male and female) was 1.86%. In female animals the number of erythrocytes, the concentration of haemoglobin, and the volume of packed red cells was found to be higher than in the male.—C. W. O.

HÖELZLE, E. (1938). Ueber die Oberflächenspannung des Kälberblutes. [**Surface Tension of Calf-Blood**].—*Inaug. Diss., Munich*. pp. 47. 31 tables. [Numerous refs.]

100 samples of calves' blood were obtained from an abattoir. The average dynamic surface tension found by the stalagmometer was 68.29 Dyn/cm., the variation being 61.25-71.83 Dyn/cm. The static surface tension measured by the Michaelis capillary method was also tried but the viscosity of whole blood was found to be too great and only diluted blood could be used. The surface tension relative to water measured by this method was 0.9019. The surface tension of the blood was found to decrease as the age and weight of the animals increased. The Meiotagmin reaction was tried on a few animals, and gave a positive result with a tuberculous bull by both methods.—A. T. PHILLIPSON.

RUNGE, W. (1938). Die Beziehungen zwischen spezifischem Gewicht, Oberflächenspannung und Viskosität im Harn kranker und gesunder Hunde. [**Interrelation Between Specific Weight, Surface Tension and Viscosity of the Urine of Diseased and Healthy Dogs**].—*Inaug. Diss., Giessen*. pp. 72. 4 graphs. [Numerous refs.]

Besides the determinations indicated in the title a complete analysis was made of all samples of urine. Urine from fifty healthy dogs was examined once in this way, while urine from 10 others, of which 8 were suffering from nephritis, was examined over periods varying from 6 to 34 days. In the first group the average specific weight of the urine was 1.021; the average viscosity of filtered urine was 1.1111 cp. and of unfiltered urine 1.3625 cp.; the surface tension of the filtered urine gave an average of 64.139 Dyn/cm. and the unfiltered urine 63.874 Dyn/cm. The presence of albumin and bile in the urine caused a greater decrease in surface tension if the specific weight was high than if it was low. The presence of albumin and bile had only a very slight effect upon the specific weight and viscosity of the urine.

As a rule the specific weight, surface tension and viscosity are independent of one another but viscosity and surface tension have a rough relationship to each other.—A. T. PHILLIPSON.

SCHIRRMMEISTER, E. (1939). Studien über Veränderungen des Zellgehaltes der Milch im Stall gehaltener Rinder während der Futterumstellung. [**Alterations in the Cell Content of Milk of Stall-Fed Cattle Due to Change of Diet**].—*Inaug. Diss., Berlin*. pp. 26. 1 table. [Numerous refs.]

Samples of milk were taken from 40 animals before and after a change from winter to summer diet; 8 samples taken at intervals of 8 days before the change, and 4 samples taken during 20 days after the change, were examined from each animal. Smears of 0.02 or 0.04 c.c. of milk were fixed and stained, and the cells were counted. The results after the change in diet were:—(1) in 23 animals there was no change in the cell count; (2) in 8 animals an increase occurred, and (3) in 9 animals with chronic mastitis no change was found. In 3 animals in which oestrus occurred during the experimental period, an increase in the number of leucocytes was found in the milk.—A. T. PHILLIPSON.

SNYDER, F. F. (1938). **Factors Concerned in the Duration of Pregnancy.**—*Physiol. Rev.* **18**. 578-596. [Numerous refs.]

There is much evidence that not only parturition but also other critical phases of embryonic life, *e.g.* ovulation, fertilization, transport of the ova and implantation, are under hormonal control. Certain manifestations of the sexual cycle occur during pregnancy in different species, and it is suggested that the length of gestation is approximately a single multiple of the cycle. Normal parturition involves two types of changes, namely (1) muscular—an increase in the contractility of the uterine muscle, and (2) decidual—separation of the placenta. These can be dissociated experimentally.

In the horse, ovulation occurs in the early stages of pregnancy, markedly increasing the luteal tissue present in the ovaries; later the corpora lutea regress. During the early stages of pregnancy the blood of the mare contains large quantities of gonadotropic hormone. In the cow the Graafian follicles may attain their full size and there are many atrophic follicles present in the ovary during gestation; oestrus and mating occasionally occur at almost all stages of pregnancy. Evidence of a follicular rhythm during pregnancy is also found in the *g.* pig and the rat. There is also evidence of abortive menstrual cycles in the monkey and the human subject.

Differences in the gestation periods of different breeds of rabbits are dependent upon hereditary factors, and the same is true for different breeds of horses. Variations in the gestation periods of a species are such that the average gestation period may approximate a multiple of the cycle, the series of pregnancies under consideration including extreme cases which range from the beginning of viability to the end of the period of post-maturity of the foetus.—J. M. ROBSON.

BUHSE, W. (1938). Erfahrungen über Trächtigkeitsfeststellung bei Stuten mit der Cuboni-Reaktion sowie Versuche zur Bestimmung des Reaktionskörpers. [**Cuboni's Test for Pregnancy of Mares**].—*Inaug. Diss., Berlin*. pp. 60. 10 tables. [Numerous refs.]

301 samples of urine from mares were tested by this method, and the following conclusions were drawn. A definite diagnosis can be given by the 150th day of pregnancy; at 120 days a 10% error in diagnosis occurs. In some animals more than one test must be made in order to establish a diagnosis. In the typical reaction curve, a positive result occurs first after 90-120 days pregnancy; the reaction then increases in intensity until the end of gestation. Some animals give a positive reaction as early as the second month of pregnancy, while in others a positive result is delayed, in one case recorded as late as the seventh month of pregnancy.

With abortion, the reaction curve has an abrupt fall after a previous positive or indefinite reaction, depending on the length of pregnancy. Several types of atypical reaction curves are also described. These account for the 10% error which occurs at the 120th day of pregnancy.—A. T. PHILLIPSON.

ELKAN, E. R. (1938). **The Xenopus Pregnancy Test.**—*Brit. med. J.* Dec. 17th. 1253-1256. 1 text fig., 8 figs. on 1 plate. [19 refs.]

E. advocates the use of the South African clawed toad, *X. laevis*, for the diagnosis of human pregnancy. The test depends on the response of the animal's gonads (female) to anterior-pituitary-like hormone present in the urine of pregnant women. The urine may be injected untreated or after treatment by Zondek's method. A positive result is indicated by ovulation within 5-12 hours. Of 150 tests performed by E., 62 gave a positive and 88 a negative reaction. All clear

positives were found to be correct ; there were 10 weak positives, which were later shown to be negative, and 3 negatives that subsequently became positive. The advantages claimed for the test are the speed with which a diagnosis can be given, and the fact that no animals need be killed to obtain the result ; the toads can be used repeatedly, as, if there is sufficient interval between the tests, they do not become desensitized.—N. J. SCORGIE.

COLE, R. K. (1938). **Histology of the Oviduct of the Fowl in Relation to Variations in the Condition of the Firm Egg Albumen.**—*Anat. Rev.* **71.** 349-361. 8 figs. on 2 plates, 1 table. [16 refs.]

The method adopted in this investigation was the correlation of interior egg quality with the histological structure of the oviduct, particularly in the albumen-secreting region. Observed variations in the condition of the firm albumen layer of fresh eggs depend on the number and distribution of the mucin-like fibres in this layer. These fibres are produced by the goblet cells lining the albumen-secreting region of the oviduct ; details are given as to the number of the goblet cells in the several portions of this region. The general conclusion is that fowls producing eggs with firm albumen of good condition, possess a consistently higher goblet cell content throughout the albumen-secreting region than those producing a more watery type of firm albumen.—N. J. SCORGIE.

## TECHNIQUE AND APPARATUS

MARTIN, L. C. (1938). **The Electron Microscope.**—*Nature, Lond.* **142.** 1062-1065. 3 figs.

The construction of the electron microscope is briefly described and the possibilities and problems of electron microscopy discussed. The instrument roughly resembles an ordinary microscope, the electrons being emitted by electrical discharge from the top of the tube, passing down it through the object to be examined and thence to a photographic plate at the bottom. In place of glass lenses to concentrate the rays, two coils of iron wire are used. Photographs have been published showing various organisms such as *Micrococcus flavus* under very high magnification such as 16,000. Bacteria are dried by a special process on an extremely thin film of collodion and then photographed without any other special treatment.—R. ALLCROFT.

LESTOQUARD, F. (1939). L'iode dans la coloration des *Rickettsia*. [**The Use of Iodine in the Staining of Rickettsia**].—*Bull. Soc. Path. exot.* **32.** 466-467. [1 ref.]

L. draws attention to the use of iodine as a mordant for rickettsia before staining with Giemsa. He recommends fixing in iodized alcohol (alcohol 98 parts, tincture of iodine 2 parts) for 8-10 minutes, then washing in alcohol, to remove the iodine, and staining with Giemsa.—U. F. RICHARDSON.

## MISCELLANEOUS

LECLAINCHE, E. (1939). L'enseignement vétérinaire et son adaptation aux exigences modernes. [**Veterinary Education and its Adaption to Modern Needs**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 127-134. [In French : English, German and Italian summaries].

Speaking on the principles of veterinary education L. first stresses the importance of requiring the highest possible level of general education for candidates for

admission as veterinary students, then goes on to emphasize the indivisibility of zootechny and what is generally considered as veterinary science. Zootechny, including animal management, breeding and feeding, ought to be taught more thoroughly in veterinary schools and the different animal species ought to be considered individually. Comparative anatomy, pathology and medicine tend to be overdone. Finally, preventive medicine should be further developed.

On the more personal side, L. draws attention to the value of veterinary associations as a means of post-graduate education.—J. E.

HABERNOLL, A. (1938). Die Haustiere als Ursache von Unfällen in Deutschland unter besonderer Berücksichtigung der Berufsverletzungen der Tierärzte Preussens. [**Domestic Animals as Cause of Accidents in Germany, with Special Reference to Occupational Diseases of Veterinarians in Prussia**].—*Berl. Münch. tierärztl. Wschr.* July 1st. 898-895, and July 8th. 407-410. 6 tables.

Official records for the period 1926-1934 show that the annual number of fatal accidents to human beings caused by domestic animals fluctuated between 298 and 417. By far the largest number of these fatalities were caused by horses and cattle (65.9% and 29.8% respectively), other domestic animals being responsible for only 8.5% of the total. A remarkable feature was the very small number of veterinarians involved: during the whole period under review only three received fatal injury; of the 975 practitioners who answered a questionnaire only 186 reported having suffered from more or less serious occupational accidents.

## OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1939). **Report of the Medical Research Council for the Year 1937-1938**. pp. 221. [Numerous refs.] London: H.M. Stat. Off. [8vo] [8s. 6d.]

The report is divided into the following main sections:—(1) an introduction, describing briefly the general nature of research work covered; (2) the work of the National Institute of Medical Research; (3) the determination of biological standards and the methods of biological assay and measurement; (4) clinical research units; (5) external research schemes; (6) research work aided by grants; (7) research in tropical medicine; (8) industrial health, and (9) travelling fellowships. The composition of the investigation committees for special subjects is given in an appendix.

A grant-in-aid of £195,000 was voted by parliament during the financial year, £10,000 being allocated to administrative and travelling expenses of the Council, £60,000 for the National Institute for Medical Research at Hampstead and the farm laboratories at Mill Hill, £95,000 for research grants to scientific work elsewhere and £30,000 for new buildings required for research in chemotherapy. Important additions to this public monetary grant were received from other sources.

### *The National Institute for Medical Research*

**Viruses.**—The report gives further information regarding egg-membrane culture of viruses and of work on measuring the size and density of infective units of viruses by centrifugal methods.

**Transmissible Tumours.**—Work on the production of malignant tumours by the injection of virus-like filtrable agents and tar was continued.

**Chemotherapy.**—Information is given of further research carried out on remedial agents for trypanosome infections. Certain long-chain aliphatic compounds with terminal guanidine or amidine groups are effective trypanocides, but

are nearly toxic in therapeutic doses. Further chemical work on these compounds is proceeding. The Institute programme included research work on many other subjects.

#### External Research Schemes

A very wide range of subjects was studied at outside institutions with the help of monetary grants from the Council; several of them are of veterinary interest. At Cambridge GRIFFITHS completed his experiments on the comparative susceptibility of the vole to infection with the three types of tubercle bacillus and the vole strain of acid-fast bacillus (WELLS) and continued an inquiry into the relative frequency of the human and bovine types of tubercle bacillus in the sputum in human cases of pulmonary tuberculosis in Great Britain. At Cambridge MARTIN, CHICK, and MACRAE have worked on the factors in the vitamin B complex which are necessary for the normal nutrition of pigs. MELLANBY of Sheffield has published an account of his work on the experimental production of deafness in young dogs by diets deficient in vitamin A and rich in cereals.

#### Biological Standards

Reference is made to the use of a dry vacuum for use in the preparation and maintenance of serum standards. A new international standard for staphylococcus antitoxin was set up in 1938 and work is continuing on staphylococcal haemolysin, tetanus antitoxin and vitamin B<sub>1</sub>. Certain hormones have also been provisionally standardized. At the Standards Laboratory for Diagnostic Suspensions and Sera, Oxford, a dried *Brucella abortus* serum has been prepared and stored.—J. C. WALLACE.

GREAT BRITAIN. (1938). **The Lister Institute of Preventive Medicine: Report of the Governing Body for 1938.** pp. 24. London: Lister Institute of Preventive Medicine. [4to].

**VIRUS DISEASES.**—AMIES carried out further research on the nature of tumour-producing agents in filtrates of avian sarcomata; previous results were confirmed. Research on vaccinia by various workers is dealt with, including investigations on the antigenic structure of vaccinia virus, vaccinia elementary bodies and the preparation of vaccine for human use.

**SEROLOGICAL STUDIES.**—SCHÜTZE and GORER continued research on the possible relationship between antibody production and resistance to disease. Serum obtained by PETRIE and HENDERSON from rabbits and horses after immunization with streptococci had no protective value for mice. HENDERSON completed a preliminary examination of the bacterial antigens of the *Clostridium welchii* group.

**GENERAL BACTERIOLOGICAL STUDIES.**—KERR (in Northern Ireland) worked on trichomonas as a cause of abortion and sterility in cattle and the investigation by STABLEFORTH on cutaneous streptothrix infection in the horse is recorded. KLEINBERGER investigated pleuropneumonia-like organisms, some of which have been isolated from cases of animal disease. HENDERSON and McCLEAN commenced a study on the influence of tissue permeability on bacterial invasion by *Cl. septique* and *Cl. welchii*.

**ENDOCRINOLOGY.**—Studies on the effects of sex hormones were continued, and included enquiry into their bisexual function, pathological changes produced by sex hormones and their action on the adrenals and the liver.

**NUTRITION.**—Reference is made to the work on standardization undertaken in connexion with vitamins A and B<sub>1</sub>, and to research at the Institute of Animal Pathology, Cambridge, on the nutritional disease produced in pigs fed chiefly on maize and casein.

NATIONAL COLLECTION OF TYPE CULTURES.—Over 200 new strains were deposited for maintenance.

The report concludes with a list of scientific papers published from the laboratories of the Institute during the year.—J. C. WALLACE.

GREAT BRITAIN. (1939). **Report of the Governing Body, Lister Institute of Preventive Medicine, 1939.** pp. 89. [Numerous refs.] London: Lister Institute of Preventive Medicine. [4to].

VIRUS DISEASES.—AMIES and CARR studied further the nature of the filtrable agents of avian sarcomata. Research on vaccinia by various workers was undertaken, including investigations on the antigenic structure of the virus, vaccinia elementary bodies, the cultivation of the virus on the chorio-allantoic membrane of the developing chick, and the chemical nature and enzymic activity of the virus.

SEROLOGICAL STUDIES.—HENDERSON has continued work on the *Clostridium welchii* group; a report is being prepared for publication. Research on antibodies by various workers is recorded, including immunity to tumour-transplantation and antibody production in response to immunization with protozoa.

GENERAL BACTERIOLOGICAL STUDIES.—The study of *Trichomonas foetus* as the cause of abortion and sterility in cattle was continued by KERR in collaboration with the Institute. HENDERSON and McCLEAN have continued their observations on the influence of tissue permeability on bacterial invasion.

ENDOCRINOLOGY.—KORENCHESKY proceeded with his investigation of different aspects of the activity of sex hormones, for example their effect on senility, on castrated males and on ovariectomized females.

NUTRITION.—Details are given of the Institute's work on vitamin standardization and of research in connexion with various groups of vitamins. The work of MARTIN, CHICK and MACRAE at the Institute of Animal Pathology, Cambridge on the nutritive requirements of the pig is dealt with.

The report concludes with a list of scientific papers published from the laboratories of the Institute during the year.—J. C. WALLACE.

EIRE. (1938). [Report of] **Veterinary College of Ireland [1937-1938].—Rep. Minist. Agric. Eire, 1937-38.** pp. 35-41 and p. [27]. 2 tables.

There were 180 students in the college during the year, 69 being new entrants. The results of the examinations of the Royal College of Veterinary Surgeons are shown in a table.

ROUTINE LABORATORY WORK.—88,859 specimens examined in the laboratory during the year consisted of 79,464 for the agglutination test for *Salmonella pullorum* infection in poultry, 579 for the agglutination test for contagious abortion in cattle, and 3,816 morbid specimens for diagnosis; an analysis of the results showing the various conditions found is given.

POULTRY DISEASES.—The following outbreaks are recorded (figure in brackets gives outbreaks in 1936-1937):—coccidiosis 206 (154); *Salmonella pullorum* infection 106 (109), and tuberculosis 150 (127). An increase in the number of cases of fowl paralysis is reported and worm infestation is a serious problem.

DISEASES OF OTHER ANIMALS.—Contagious abortion, sterility and mastitis in cattle, worm infestation in young thoroughbred horses and sterility in mares are conditions mentioned as requiring investigation. Work has been done on pneumonia in young pigs and advice given on diseases of silver foxes.—J. C. WALLACE.

EIRE. (1938). [Report of] **Veterinary Research Laboratory [1937-1938].—Rep. Minist. Agric. Eire, 1937-38.** pp. 69-70.

The following specimens were received for examination :— anthrax 13 ; contagious bovine abortion 622 ; parasitic mange 5 ; sheep scab 281 ; swine fever 165 ; tuberculosis 2,842, and miscellaneous 205. The anthrax, parasitic mange, and swine fever material proved negative ; 208 scrapings of wool contained sheep scab acari.

The following vaccines were issued :— anti-abortion 5,090 doses, blackleg 17,080 doses, and braxy 20,159 doses. Research work was continued on problems connected with contagious bovine abortion and tuberculosis in swine.—J. C. W.

**INDIA.** (1988). **Annual Report of the Imperial Council of Agriculture Research for 1937-38.** pp. 168. 12 appendixes. Delhi : Manager of Publications. [8vo] [12 annas : 1s.]

Legislation that may be employed for the co-ordination of the control of live-stock diseases is still under consideration.

The recommendations of the animal husbandry section in the report of the previous year regarding castration, vaccination, etc., were generally acceptable to the various Provinces and States. In order to retrieve lost trade in livestock it is recommended that quarantine stations be established at the four larger ports, and investigation is to be made on the diseases of sheep and goats awaiting export. Funds have been supplied for research into methods of TICK CONTROL in Bombay Presidency.

Information is being collected regarding the indigenous drugs used and methods of treatment adopted by experienced cattle breeders in India. Systematic work on the parasites of stock has begun ; the necessity of co-ordinated work on diseases of poultry is emphasized. In the Punjab a deficiency of minerals in fodder appeared to have a bearing on the degree of PARASITIC INFESTATION of stock, and the supplying of a balanced ration helped greatly in the elimination of parasites. SURRA has been shown to be widespread in bovines, but does not, under ordinary circumstances, cause heavy mortality. Much useful work has been accomplished by Veterinary Investigation Officers, and the Council has recommended that the service be extended.

141,000 cattle were vaccinated with goat virus against RINDERPEST in the Central Provinces and Berar.

Work on the WARBLE FLY has been started in Muktesar. A research officer is to be trained in the United Kingdom for research work on TUBERCULOSIS and JOHNE'S DISEASE and another for work on poultry diseases.—F. J. ANDREWS.

**UNION OF SOUTH AFRICA.** (1988). **Annual Report of the Division of Veterinary Services for 1937.** [DU TOIT, P. J.]—*Fmg S. Afr.* 13. 496-497 and 505-518. 9 tables.

The report is divided into two sections dealing with (1) laboratory work at Onderstepoort, and (2) field work. During the year a very heavy call was made on the field staff in connexion with the outbreaks of foot and mouth disease, first in the Barberton district and later in Northern Natal. These outbreaks were successfully dealt with by the slaughter-out policy.

#### I. LABORATORY WORK.

**INFECTIOUS DISEASES.**—Increase in the production of most of the vaccines issued was recorded. There was a great increase in the demand for pure anaplasmosis vaccine as a result of the spread of the disease in Bechuanaland. Several cases of THEILERIASIS associated with Koch's bodies were tested on recovery with East Coast Fever infected ticks, and died of the disease, demonstrating that the

type of theileriasis from which they had previously suffered was *Theileria mutans* infection.

Complement-fixation tests for DOURINE carried out at regular monthly intervals showed that there has been little variation in the titre of the reaction in animals observed over a period of four years. Three out of five mares exposed to an infected stallion became infected, and *Trypanosoma equiperdum* could be demonstrated in vaginal washings.

With regard to NAGANA, the campaign against tsetse flies using the Harris trap has been continued on an increasingly extensive scale. The numbers have decreased to such an extent that the flies are more and more dependent on wandering big game animals for their distribution.

From an outbreak of a disease in dogs in the Eastern Transvaal *Rickettsia canis* was isolated and research work on RICKETTSIOSIS is proceeding. Investigation of the duration of immunity in heartwater showed that recovered sheep were still immune after two years.

During the year five antigenically different neurotropic strains of HORSE-SICKNESS virus were included in the vaccine, which continued to give very satisfactory results. It was found that the antibody content of the serum of a horse was probably not a true index of its immunity. A physicist was appointed to help in the investigation of the filtrability of virus. Many unsuccessful attempts were made to infect laboratory animals with BLUETONGUE by a great variety of methods but without success. Some evidence was obtained that there is more than one strain of bluetongue. The inoculation of rabbits for the diagnosis of RABIES infection was discontinued in favour of mouse inoculation, which has the advantage of enabling a diagnosis to be made in ten days in most cases.

The results of the "block" inoculations against ANTHRAX in the Transkei have been very successful and show the value of systematic animal inoculation. A vaccine made from avirulent rough strains gave a satisfactory protection against infection in the field.

The technique of the agglutination test for BRUCELLOSIS was revised in order to bring it into line with that used in Great Britain and recommended by STABLEFORTH.

A number of different types of vaccines against SALMONELLOSIS were tried out on laboratory animals. These included auto-endotoxoids of *Salmonella enteritidis* and *S. typhi*. The results were roughly the same with all the vaccines used.

An outbreak of DYSENTERY in young foals on a stud farm in the Cape Province was found to be due to *Clostridium welchii* type B, the cause of lamb dysentery.

PARASITOLOGY.—A great deal of work was done on HOOKWORMS in sheep and an emulsion of tetrachlorethylene is now issued to farmers for treating sheep. A commencement was made with a survey of TICKS in the Union.

NUTRITION.—A programme of work on deficiency aspects of nutrition was carried out, mainly confined to the protein aspect.

PHYSIOLOGY.—Studies on photosensitization were continued, and a programme of work on certain aspects of ruminant digestion was commenced, a study being made of rumenal movements and the fauna of the fore stomachs.

PHARMACOLOGY and TOXICOLOGY.—Experiments on the toxicity of aluminium were undertaken. The detection of strychnine in carcasses after various periods was undertaken, and several poisonous plants were studied in order to try to isolate the toxic principles. These included *Dimorphotheca sinuata* and *Lotononis laxa*.

MEAT and MILK HYGIENE.—During the year the new building for the study of problems relating to meat was completed. A good deal of preliminary work

was done on mastitis in South African herds, and a comprehensive programme of research work is being undertaken.

In addition to the sections of the work previously mentioned, the programme of experimental work on ZOOTECHNY, mainly at the farm Armoedsvlakte in Bechuanaland, was continued. Wool research was continued on a big scale, and a great deal of development took place in poultry research.

During the year a commencement was made with the campaign against BACILLARY WHITE DIARRHOEA in chickens.

## II. FIELD WORK

The activities of the field staff were mainly devoted to the combating of F. & M. DISEASE. Three outbreaks occurred, one in Northern Natal, one in Barberton and a small one in the Kruger National Park. The slaughter-out policy was undertaken in all three outbreaks. Burning was found difficult, and the animals were shot and buried in deep trenches, dug with mechanical shovels. It was found that .22 cartridges were more suitable than .303. In Natal two conditions, with lesions on the tongue and gums, were encountered in cattle, but proved not to be F. & M. disease. One was a very superficial erosion, but in the other there were lesions present which very closely resembled those of F. & M. disease.

Several new centres of infection of RABIES were discovered and experiments on the gassing of meerkat colonies were continued.

EPIZOOTIC LYMPHANGITIS remained localized to the coastal districts of the Eastern Cape Province. It appears to be associated with heavy tick infestation (*Amblyomma hebraeum*).

There was a decrease in the total number of outbreaks of SHEEP SCAB during the year, but there was a setback in the Transvaal where there were several fresh outbreaks.

Material progress was made in the eradication of DOURINE in the Western Province, one district being completely cleared up.

Marked improvement was noted in the ANTHRAX position in the Transkei and Natal, where mass inoculations were carried out. The position in other areas remained the same.

The position with regard to EAST COAST FEVER continues to improve, and in the Transkei no outbreaks were recorded during the year. In Natal there were 15 outbreaks, almost confined to two districts.—E. M. ROBINSON.

NYASALAND PROTECTORATE. (1938). [Report on] Cattle [1937].—*Rep. Dep. Agric. Nyasaland, 1937*. p. 62.

This is a short report on an attempt to keep cattle, apparently working bullocks, on a cotton station where tsetse fly is common. On the outbreak of the rains regular injections of antimosan (Bayer) were given [no details], but five bullocks died from trypanosomiasis. At the end of the season only four bullocks remained—the original number is not stated. No treatment was given during the dry season, and the bullocks improved in condition, and were worked between July and November. Treatment had to be restarted in October. Blood smears were taken at regular intervals, and trypanosomes were invariably found from two of the surviving bullocks and less regularly in the other two.—F. J. ANDREWS.

ZANZIBAR PROTECTORATE. (1939). *Report of Veterinary Work, 1938*. [AHMED, F. D.]—*Rep. Dep. Agric. Zanzibar, 1938*. pp. 12-13. 1 table.

A few cases of trypanosomiasis in dairy cattle were observed. Tsetse flies have never been seen in Zanzibar, so it is thought that other biting flies transmit the disease. Piroplasmosis and fowl typhoid are also mentioned.

The number of animals slaughtered at Zanzibar is given and it is recorded that the Veterinary office trained two pupils and instructed sanitary inspectors in meat inspection.—J. E.

COLONY OF GAMBIA. (1938). **[Report on Livestock [1937-1938].—Rep. Dep. Agric. Gambia, 1937-38.** pp. 17-19.

A veterinary officer visits the Colony for six months each year to immunize the cattle against rinderpest. A rinderpest immunization scheme was commenced in 1938. 1,800 head of cattle were immunized in 1935-36, 11,690 in 1936-37 and 8,626 in 1937-38; the scheme will be completed in the 1938-39 season. In the absence of the veterinary officer attempts are made to control the disease by local quarantine orders, but there are difficulties that stand in the way of success. The mortality in two outbreaks was 2,000, 5% of the total cattle of the country. Details are given of the incidence of the disease.

Active immunization has to be carried out with special care, because of the high susceptibility of the local cattle. Spleen vaccine is injected and after 14 days serum and virus are given, followed a week afterwards by an injection of virus. Both serum and vaccine are produced locally in the field.—F. J. ANDREWS.

ANTIGUA. (1938). **Annual Report of the Veterinary Officer, Antigua, for 1937.** [HUTSON, L. R.] pp. 5. 3 tables. Antigua: Govt. Printer. [fcp] [2d.]

ANIMAL DISEASES.—No outbreaks of epidemic contagious disease occurred. BOVINE TB. claimed many victims and control legislation is to be introduced. TETANUS was observed in horses. A few cases of STRANGLES were successfully treated with sulphanilamide. An outbreak of INFECTIOUS FELINE GASTRO-ENTERITIS caused severe losses. Manson's eyeworm, *Oxyuris mansonii* was recorded in poultry.

ANIMAL HUSBANDRY.—In order to improve the local livestock, five breeding centres were established at each of which a three-quarter bred Holstein-Zebu bull and a British Alpine buck goat were placed for service. A Large Black boar is also to be placed at each of these centres. Cattle are used for draught work on most of the sugar estates. Horses and donkeys are used much more commonly than mules. A total of 2,979 animals passed through the public slaughter market. 304 animals of all kinds were imported, and hides and skins to the value of £888-15-0 were exported.—R. FISHER.

BRITISH GUIANA. (1939). **Report of the Veterinary Division for 1937.** [BONE, T.] —Div. Rep. Dep. Agric. Brit. Guiana, 1937. pp. 99-101. 1 table.

This year's report is very short, the only animal disease mentioned being anthrax, of which two outbreaks occurred. Notes are also given on animal husbandry, the stock farms and animal export.—J. E.

ESTONIA. (1938). Diagnostilise osakonna uurimistegevusest 1937. aastal. **[Report of the Diagnostic Section of the State Serum Institute, Tartu, for 1937].** [SIKKUT, M.]—*Eesti loomaarsti. Ring.* 14. 143-150. [German summary].

Out of 2,016 milk samples examined for MASTITIS 216 were positive for *Streptococcus agalactiae*, while in 17 cases infection was found to be due to coliform bacteria, in 8 cases to staphylococci, and in 10 cases to *Str. pyogenes*.

2,554 specimens were examined for TUBERCULOSIS, comprising 1,482 milk samples, 1,114 bronchial mucus samples, 7 uterine mucus samples and an organ in one instance. *Mycobact. tuberculosis* was present in 19 milk samples, in 182 bronchial mucus samples, and in one uterine mucus sample.

During the year 22,884 specimens were examined. The diagnostic work was mainly concerned with BRUCELLA INFECTION, TUBERCULOSIS and STREPTOCOCCAL MASTITIS of cows. Of 16,803 blood samples examined for BRUCELLOSIS, 828 were positive.

11 cases of RABIES, 864 of SWINE ERYSIPELAS and 14 cases of ANTHRAX were diagnosed. More detailed data are given in a table. Antirabic vaccine was issued for use on 142 animals.—ELFRIDE RIDALA (TARTU).

HOLLAND. (1939). Jaarverslag van den veterinaire hoofdinspecteur van de volksgezondheid, belast met het toezicht op de uitvoering van de vleeschkeuringswet, staatsblad 1919, No. 524, over het jaar 1937. [**Holland : Report of the Veterinary Inspector for Public Health and Meat Inspection for 1937**]. [BERGER, H. C. L. E.] pp. 123. Numerous tables. The Hague: Public Health Department. [4to].

Meat consumption decreased during the year on account of general unfavourable economic conditions.

Statistical information is given on numbers of animals slaughtered, condemned and destroyed in the various meat inspection areas, also on the numbers and percentages of cases of cysticercosis, echinococcosis and tuberculosis observed. Cysticercosis was most common in Groningen (in 1.5% of cattle) and in Drenthe (in 2.3% of calves). Echinococcosis varied greatly in incidence and in the different species of animal and was prevalent in horses in Friesland and around Rotterdam. TB. was present in 73,980 adult cattle (20%) and in 65,048 pigs (5.5%). A few cases of John's disease were also seen.

Three outbreaks of meat poisoning are recorded :—paratyphoid infection from foal meat, *S. typhi-murium* infection from horse meat and botulism from a pig. —J. E.

HOLLAND. (1937). Mededeelingen betreffende den Gezondheidsdienst voor Vee in Friesland. Achttiende jaarsverslag 1 Mei 1936-30 April 1937. [**Report of the Animal Health Service for Friesland for 1936-1937**]. [VEENBAAS, A. H.] pp. 32. 2 tables, 2 graphs. [8vo].

The control of bovine tuberculosis in cattle is progressing. There was extension of tuberculin testing; 11.6% of the cattle tested yielded positive reactions against 18% in the previous year, and the number of herds free from infection rose from 4,800 to 6,110.

For the control of John's disease in cattle the use both of microscopic examination of faeces and of the intradermal test with avian tuberculin is recommended.

A campaign was initiated in 1936 for the control of infectious abortion in bovines, 11,000 cattle on 370 farms being tested: 57 farms were free from infection. In 1936 no cases of swine fever were reported from Friesland, and steps should be taken to prevent the importation of this disease from abroad.

HOLLAND. (1936). Overzicht der onderzoeken van het uit de praktijk ingezonden ziektemateriaal in 1935. [**Report of Diagnostic Work Done in 1935 at the Parasitic and Infectious Disease Institute at Utrecht University**]. [JANSEN, J.]—*Tijdschr. Diergeneesk.* 63. 663-671. 2 figs., 1 table.

This report is a summary of the examination of material of diverse origin. The most noteworthy cases seen were TB., pigeon pox, trichomoniasis and poisoning through eating buds of *Hydrangea hortensia*—all these conditions in pigeons. Coccidiosis of the kidneys (*Eimeria truncata*) was found in a goose, while TB. was

detected in turkeys and peacocks. *Clostridium novyi* was twice isolated from abscesses in horses. *Streptococcus equi* was isolated from pus of two mares with abscesses around the anus and vulva. Generalized TB. was found in wild owls (*Tyto alba*), and coccidiosis was also diagnosed (*Isospora buteonis*) in other owls. In silver foxes *Salmonella enteritidis* var. *dublin* was the commonest pathogen detected, and some cases of TB. were found.—JAC. JANSEN (UTRECHT).

JANKAUSKAS, S. (1938). Antraji valdines veterinarijos organizacijos darbuotes dešimtmeti bebaigiant. [**The Second Ten Years' Work of the State Veterinary Service, Lithuania**].—*Vet. ir Zootech., Kovno*. 15. 129-140.

After the last war there was a great shortage of veterinarians in Lithuania, the number in 1922, for instance, being only 24. Animal diseases were widespread in the country during the war. Meat was inspected only in the large towns. The veterinary service took measures to increase the number of veterinarians, and in 1922 a veterinary section was opened at the Faculty of Medicine, Kaunas University; owing to lack of personnel and necessary equipment, however, this section only existed for six years, and produced only 15 graduates. From 1928 Government grants provided for veterinary study abroad, until 1938, when a Veterinary Academy was again founded at Kaunas.

In the first ten years after the war certain animal diseases were eradicated; in the second decade more attention was paid to the control of chronic infections such as tuberculosis and brucellosis. Meat inspection was put under control. At present meat inspection is carried out in Lithuania in over 120 country towns. In the next decade it is anticipated that the veterinary service will undertake milk control work and regulate the slaughter of horses for human consumption.

—A. PABIJANSKAS (KAUNAS).

PORTUGAL. (1938). Nota estatística dos serviços do Laboratório Central de Patologia Veterinária nos anos de 1936 e 1937. [**Statistical Report of the Central Laboratory of Veterinary Pathology, Lisbon, for the Years 1936 and 1937**].—*Repos. Lab. Pat. vet., Lisboa*. 3. 267-281.

The following are the numbers of the specimens dealt with and examinations carried out:—(1) bacteriological and serological, 9,812; *Mycobact. tuberculosis*, 1,044; *Brucella abortus*, 675; *Pasteurella suisepitica*, 225; *Salmonella cholerae-suis*, 106, and *S. paratyphi-B.*, 55; (2) ecto- and endo-parasites, 826; (3) histopathological examinations in 1936, 59; no examinations during 1937; (4) P.M. examinations, total 163—swine fever, 28; enteritis, 12; (5) physical and chemical, total 1,119; (6) testing of sera and determining strength of disinfectants, total 440.

The laboratory produced over 1,000 litres of foot and mouth disease serum, 397 litres of swine fever serum, 134 litres of the virus, 414 litres of lactic ferments, and 1,729 c.c. of concentrated tuberculin. It is to be noted, however, that the laboratory's output in 1937 was only half that of the previous year.—J. PASFIELD.

FRENCH WEST AFRICA. (1939). État sanitaire du cheptel pendant l'année 1937. [**Report on Animal Diseases in French West Africa in 1937**]. [CURASSON, G.]—*Bull. Serv. zootech. Epiz. A.O.F.* 2. No. 1. 61-76.

[A description of livestock diseases is given *seriatim* for each territory; in this abstract, however, the figures given below have been roughly calculated to embrace the whole of French West Africa].

ANTHRAX and BLACKLEG outbreaks occurred in various localities; vaccination was carried out to a limited extent. BOVINE TUBERCULOSIS was rarely seen in the course of abattoir inspection. An intensive study of TRYPANOSOMIASIS was begun; a few notes on its occurrence are given.

RINDERPEST was prevalent everywhere but in French Guinea, losses reported being about 10,500. Over 400,000 cattle were immunized, mostly by formol-vaccine, some by sero-vaccination, some by vaccine-virus and a small number by serum alone. In Senegal wild pigs have been incriminated as carriers.

FOOT AND MOUTH Disease occurred in the provinces of Sudan and Niger. CONTAGIOUS BOVINE PLEURO-PNEUMONIA occurred in all colonies except French Guinea and Dahomey, and some 14,000 cattle were vaccinated [no details]. AFRICAN HORSE SICKNESS gave much less trouble than usual, only one case occurring at Dakar and 12 in the French Sudan. SHEEP POX was observed only locally, in the provinces of Sudan and Senegal; CAMEL POX was seen in Mauritania and FOWL POX in every colony. Three cases of AUJESZKY's disease occurred in French Guinea and several cases of RABIES in French Guinea and the French Sudan. PLEURO-PNEUMONIA OF GOATS is listed under virus diseases; it is endemic in the Niger province.

Short notes are also given on a few other infectious and parasitic diseases.

—J. E.

### Extracts from Annual Reports of Agricultural Experimental Stations U.S.A.

[The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports will be found in *Index Veterinarius*].

ARKANSAS, 1936-37. The egg production and food utilization of hens treated by kamala and nicotine sulphate was no better than in comparable hens not so treated, observations lasting for one year.

CALIFORNIA, 1936-38. The present knowledge on research and control of the following diseases is given, original references being appended:—cattle diseases—mastitis, tuberculosis, brucellosis, trichomoniasis and anaplasmosis: sheep diseases—caseous lymphadenitis, enterotoxaemia and stomach worms: swine diseases—swine pox: poultry diseases—pullorum disease, coryza, paratyphoid in chick and turkey poults, coccidiosis, fowl pox, "swell head" (sinusitis) of turkeys, *Hexamita* infection in turkeys and hereditary lethal factors: entomology—myiasis in livestock (*Lucilia* and *Phormia*).

COLORADO, 1937-38. Notes are given on bovine brucellosis control; equine encephalomyelitis; enterotoxaemia, coccidiosis, sore mouth (ecthyma), internal parasites and "sore head" (filariasis) in sheep, and on poisonous plants (oat hay, onion, *Suckleya suckleyana* and silky sophora).

CONNECTICUT (STORRS) 1936-37. [Owing to the wealth of original data, this report is abstracted separately below].

IDAHO, 1937. The following results are given:—(1) Mastitis is not transmissible by infected milk filtrate. (2) Sulphanilamide causes the disappearance of streptococci from milk of cows with mastitis, but they reappear on cessation of treatment. (3) Pullorum disease is discussed (diagnostic tests, infection in immature pullets and in pheasants). (4) The susceptibility to fowl paralysis of day-old chicks from a clean flock is very great, but declines sharply within a few weeks; an affected flock acquires resistance. (5) A study of the inheritance of disease-resistance in fowls was begun. (6) Orchard grass is rich in manganese and consequently valuable for the prevention of perosis.

INDIANA, 1936-37. (1) Comparison of rapid and slow tests for pullorum disease was made. (2) Various observations on immunity in bovine brucellosis are given. (3) Results of urine analysis of pigs with swine fever are given, also notes on the efficacy of many commercial S.F. antisera. (4) Several experiments

designed to indicate the unity of fowl paralysis, leucosis and neoplasia gave inconclusive results. (5) Notes are given on results of general P.M. diagnostic work.

IOWA, 1936-37. (1) Tumour filtrate from fowls with the lymphoid type of fowl leucosis was submitted to electrophoretic tests, results at various pH being given. (2) Tentative evidence for the heritability of fowl paralysis was obtained by breeding trials. (3) The value of manganese for preventing perosis was verified (0.0085% Mn in the diet is the minimum required). (4) Lambs brought up on cows' milk tend to develop anaemia, which is curable by administration of ferric chloride plus copper sulphate; normal lambs have 10-12 g. haemoglobin per 100 c.c. blood. (5) The vitamin D content of cows' milk is increased by feeding irradiated yeast, certain molds and ergosterol, though cows are inefficient in passing on extra vitamin D from food to milk; hens are relatively more efficient in transferring it from food to egg. (6) Tests with goats indicated the relative unimportance of vitamin E for reproduction. (7) Work on fluorine toxicosis on rats is reported. (8) Inheritance of resistance of fowls to fowl typhoid was demonstrated experimentally; similarly the resistance of mice to typhoid [*Salmonella typhi*].

IOWA, 1937-38. (1) A regional laboratory for poultry disease research was founded at East Lansing, Michigan; it will cooperate with Iowa. (2) The research projects numbered (1) and (2) in the 1936-1937 report above were continued [no data]. (3) Data on the prevention of perosis in turkeys are given. (4) Tests with sheep indicated the importance of vitamin E for reproduction [cf. item (6) above]. (5) Dried buttermilk enhances rather than inhibits the severity of avian coccidiosis. (6) Resistance to disease: further progress was made on item (8) above.

MASSACHUSETTS, 1937-38. (1) There are now 241 pullorum disease-free breeding flocks in the State capable of supplying all poultry farmers. (2) Results of general P.M. diagnostic work are given. (3) An attempt to control infectious bronchitis in poultry by a vaccine failed. (4) Pullorum disease was found in two flocks of turkeys. (5) Avian encephalomyelitis ("epidemic tremor") was studied [no data]. (6) A beginning was made in the investigation of a neoplastic disease of fowls.

MICHIGAN, 1937-38. Short notes are given on the following [all of which have been described in periodicals indexed by this Bureau]:—streptococcal mastitis, streptococcal infection in dogs, brucellosis in cattle and in man, antigenic and chemical study of brucella and the inheritance of umbilical hernia in rats.

MINNESOTA, 1936-37. The list of publications from the station includes some on veterinary subjects, showing the nature of the work and the journal reference in cases where independent periodicals were used. [Such papers are dealt with separately in the Bureau publications]. Veterinary research projects are also listed.

NEW JERSEY, 1936-37. (1) Points of special interest for the poultry disease diagnosis service are stated. (2) A précis of work on the viruses of fowl pox, laryngotracheitis and bronchitis is given; all have been passaged in egg embryos. (3) A study of fowl paralysis and its inheritance was continued. (4) Pigeon paratyphoid was controlled with the aid of the agglutination test.

RHODE ISLAND, 1937. (1) Growth factors and their sources for *Haemophilus gallinarum* were studied; also *H.g.* cultures were used as a vaccine against fowl coryza, but were not uniformly effective. (2) An attempt was begun to find a food factor capable of preventing encephalomalacia in chicks.

SOUTH CAROLINA, 1936-37. (1) An inconclusive experiment on the effect of kidney worm infestation on the growth of pigs is reported. (2) An unsuccessful attempt was made to immunize fowls against fowl paralysis by a formol vaccine.

SOUTH DAKOTA, 1936-37. (1) In a controlled experiment, pigs infested with

*Ascaris* and kept on pasture containing chenopodium plants did not benefit in general condition or degree of infestation. (2) Work was done on the nature of the toxic substance in grain causing alkali disease (selenium poisoning), on the tissue Se content of poisoned dogs, and on Se tolerance and toxicity in fowls.

UTAH, 1936-38. A note is given on the duties of the single veterinarian on the staff of the station. Notes are also given on animal diseases investigated at the station during its fifty years' work.

WASHINGTON, 1937-38. (1) Factors influencing the reliability of the Hotis test for mastitis are discussed. (2) An experimental study of a liver disease of swine ("hard liver") drew attention to the yellow burweed (*Amsinckia intermedia*) as the probable cause. (3) *Salmonella pullorum* in soil remains infective during winter frosts, but dies out in spring.

WISCONSIN, 1937-38. (1) Research in progress on mastitis is discussed. (2) Cases of *Brucella abortus* infection in cows which calved normally and had no specific agglutinins are described; the possession of blood having a good bactericidal power against brucella *in vitro* is no evidence that cows are resistant to fresh infection. (3) Sulphur in the diet of very young chicks makes them more resistant to coccidiosis, but also tends to cause alopecia. (4) Both ferrous and ferric iron are a cure for anaemia. [Several other nutrition-disease items also appear, as well as several others not closely related to the interests covered by this Bureau].

WYOMING, 1937-38. Short notes are given on fowl coryza (failure of a vaccine), infectious abortion in ewes, calf diphtheria, equine encephalomyelitis, contagious ecthyma, and on oat hay and other plant poisoning.—J. E.

UNITED STATES OF AMERICA. CONNECTICUT. (1937). **Report of Work on Animal Diseases at Storrs Agricultural Experiment Station, 1936-1937.**—*Rep. Storrs agric. Exp. Sta. 1936-37.* pp. 15-31. 2 tables.

For the control of BOVINE BRUCELLOSIS 40,000 blood samples were tested, 560 herds being involved; 344 of them passed one or more tests under the federal eradication plan. The disease was eradicated quickly in 64% of the herds under control, by the removal of reactors to the first test. Reinfection in clean herds has caused some trouble. A multiple pipetting machine for use in the agglutination test was designed.

Much work was done on MASTITIS—diminution of milk yield, serological typing of streptococci, diagnosis by various rapid tests, control by segregation and the staphylococcal type of infection being dealt with. The pathogenicity of staphylococci examined was closely related to their haemolytic power for cows' blood.

*Salmonella bareilly* and *S. montevideo* were isolated from fowls, evidently for the first time.

A study was made of a MENINGO-ENCEPHALITIS of sheep which was found to be associated with listerella infection.

FOWL PARALYSIS and allied diseases were studied and a report made in Station Bulletin 218 [*V. B.* 8. 458].

The report also contains an interesting survey of animal diseases of Connecticut, including statistical information.—J. E.

UNITED STATES OF AMERICA. NEVADA. (1938). **Report of Division of Animal Industry, State Department of Agriculture, 1936-1938.** [EARL, W. B.] —*Bienn. Rep. Nev. Dep. Agric. 1936-38.* pp. 10-23.

STAFF.—Two whole time and three part time veterinarians were employed by the state.

ANIMAL DISEASES.—No serious losses occurred, but ANTHRAX and EQUINE ENCEPHALOMYELITIS were troublesome in certain areas. A single dose anthrax vaccine has now been adopted for general use and was applied on a large scale. The state retained its status as a modified accredited area. Control of bovine BRUCELLOSIS was intensified and blood tests were extended to beef and range cattle. There were 33 accredited herds at the end of the biennium. BACILLARY HAEMOGLOBINURIA in cattle persisted and caused small losses; a vaccine is available for immunization. EQUINE ENCEPHALOMYELITIS was controlled by serum-virus immunization, while serum is also available for curative and short term protective purposes. Vaccination against SWINE FEVER was only permitted for garbage-fed swine kept in quarantine. In other herds disease is controlled by legal veterinary-police methods alone. Nevada was free from RABIES in dogs. Statistics are given of state control work.—J. E.

### BOOK REVIEWS

HADLEY, F. B. [D.V.M., Professor of Veterinary Science in the University of Wisconsin and Veterinarian of the Wisconsin Agricultural Experiment Station]. (1939). **Principles of Veterinary Science**. pp. 594. 127 figs., 1 chart. Philadelphia & London: W. B. Saunders Company. [3rd Edit.] [8vo] [18s.]

This is a completely revised edition of a book written for agricultural students; the second edition appeared in 1924.

It is an excellent book of its type and easily the best for agricultural students that the reviewer has seen, as it is very well-balanced and gives the essentials of anatomy, physiology, general pathology, pharmacy, hygiene, zootechny, obstetrics and the common diseases of farm animals and their treatment.

The figures are very good; many have been borrowed from veterinary text-books (e.g. from Sisson's "Anatomy"). The general lay-out and printing are also excellent. There is a good index.—J. E.

BURDON, K. L. [Ph.B., Sc.M., Ph.D. Assistant Professor of Immunology, Louisiana State University School of Medicine, New Orleans; Senior Visiting Pathologist, Charity Hospital of Louisiana at New Orleans; formerly instructor of Bacteriology, Immunology and Public Health, Washington University School of Medicine, St. Louis]. (1939). **Medical Microbiology**. pp. xii + 763. 120 figs. [Numerous refs.] London & New York: Macmillan Company. [8vo] [18s. 6d.]

This book has been written on much the same lines as the author's *Text-book of Bacteriology* published a few years ago. It is essentially a book for medical students, and the needs and interests of the undergraduate have been given primary consideration. It deals primarily with fundamentals and the arrangement of the subject matter departs from the conventional in several aspects.

The book consists of four parts. Part I treats of the fundamentals and history of microbiology at a much greater length than is usual in such text-books. Part II deals with the use of the microscope, microscopic methods and laboratory technique. This is followed by a consideration in Part III of the various phenomena usually described under the headings of infection and resistance, and Part IV, which occupies less than one third of the book, contains the bacteriology of important infectious diseases. B. is certainly original in the way he has dealt with his subject, and he has presented a wealth of information in a most interesting style. To do this however, much strictly bacteriological information has been omitted and comparatively little detail is given of cultural characters, biochemical reactions, etc.,

which are essential for the identification of the causal organisms. There are, however, useful appendices dealing with stains, reagents, culture media, serological tests, etc., and one containing review questions on each chapter of the book.

From the veterinary standpoint the book contains little essential information that is not already available, and being purely a text-book of human microbiology it makes little reference to diseases of animals not communicable to man. Where reference has been made to animal diseases, some of the statements are not strictly correct, e.g. one could hardly maintain that actinomycosis was commoner in the horse than in man (p. 633).

The book is very well written and produced. Incidentally in the review copy pages 277-290 are duplicated.—GWILYM O. DAVIES.

SCHLEUNERT, A. [Dr. med. vet. et phil., o. Prof. a.d. Universität Leipzig. Direktor des vet.-physiol. Instituts], TRAUTMANN, A. [Dr. med. vet., o. Prof. a.d. Tierärztl. Hochschule in Hannover. Direktor des physiol. Instituts], & KRZYWANIEK, F. W. [Dr. med. vet., o. Prof. a.d. Friedrich-Wilhelms-Universität Berlin. Direktor des Instituts für Vet.-Physiologie]. (1939). *Lehrbuch der Veterinär-Physiologie. [Text-Book of Veterinary Physiology]*. pp. viii + 449. 169 figs. Berlin: Paul Parey. [8vo].

This book has been written to take the place of the 3rd edition of *The Comparative Physiology of the Domesticated Animals*, by ELLENBERGER and SCHLEUNERT (1925) and a 4th edition of that book will not be produced.

The shortening of the veterinary course in Germany has created a need for a short text book on veterinary physiology which covers the whole subject and which can be brought up to date easily from time to time. This book has been written with this object in view. It consists of ten sections; the first two are introductory covering 49 pages. Section 3 is entitled "The ingestion, utilization and excretion of solid and liquid food"; it is the largest section of the book and covers 155 pages. Curiously enough, in this section are included the blood, and the circulatory, lymphatic and the reticulo-endothelial systems. Section 4 deals with respiration (24 pages); section 5, with the total metabolism of the animal body (30 pages). Section 6 deals with the endocrine control of metabolism and includes a section upon vitamins in relation to metabolism (45 pages). Section 7 deals with the physiology of muscle and locomotion (26 pages); section 8 with the organs of special sense (43 pages); section 9 with the central, peripheral and autonomic nervous systems (33 pages), and section 10 with reproduction (18 pages). The index comprises the remaining 18 pages.

The value of the book can be roughly assessed by the space allotted to the various sections. The text is exceedingly condensed and numerous illustrations and diagrams are included. It offers somewhat different views from those expressed in *The Physiology of the Domestic Animals* by Professor H. H. DUKES [V. B. 8. 66.], as it summarizes the research of continental workers, while DUKES lays more stress upon American work. It is to be regretted that no references are given, as this omission considerably reduces the value of the book for those engaged in post-graduate study and research.—A. T. PHILLIPSON.

TEHVER, J. [Dr. med. vet., Professor of Histology and Embryology of Domestic Animals at the University of Tartu, Estonia]. (1938). *Koduloomade sigimine. [Reproduction in Domestic Animals]*. pp. 185. 65 figs., 2 plates, numerous tables. [Numerous refs.] Tallinn: Kirjastusühisus "Agro-noom." [Kr. 3.20].

The book gives a survey of the present knowledge on the subject. Its purpose

is to be of service to many different readers—in the first place to the scientist, and also to stock inspectors and to the better educated stock-farmers.

There are chapters on :— reproduction in general, the genital organs, secondary sexual characters, germ cells, the sexual-cycle, oestrus, mating and artificial insemination, ovulation, sex hormones, foetal development and growth, foetal membranes and the placenta, growth after birth, duration and diagnosis of pregnancy, parturition, the sex-ratio and efforts to influence it, fertility, and milk and its secretion.—ELFRIDE RIDALA (TARTU).

DAVIES, W. L. (1939). **The Chemistry of Milk.** pp. xiv + 534. 27 figs., 123 tables. [Numerous refs.] London: Chapman & Hall Ltd. [2nd Edit.] [8vo] [25s.]

Milk and its derivatives have an international appeal and importance as articles of food and their study has interested scientific workers from many different aspects. The chemistry of milk, in its widest aspects, has an appeal to both pure and applied chemists, physiologists, nutritionists and to workers in specialized branches of agricultural, medical and veterinary research as well as to those concerned with the economic side of milk, the producers and manufacturers. Because of the breadth of this appeal, this book, now in its second edition within three years, has already achieved a great popularity, largely through the thoroughness with which the author has tackled his subject, in the presentation of established knowledge, in the critical review of work which has yet to receive confirmation and in the broad suggestions of lines of future investigations. Not a little of the data presented has been the result of researches by either the author himself or workers closely associated with him.

Broadly, the book is divided into five sections: the general composition of milk; its specific constituents; its physical chemistry; the chemistry of milk processing, and finally, the nutritional value of milk. The first section is general and is well worth studying by anyone interested in the subject, and while the subsequent sections will appeal more to the specialist in the various fields, it is to be remembered that this book is a very complete reference work, covering some 1,500 references. The section on milk constituents, comprising one-third of the contents, is a thorough exposition of all the major and minor elements and compounds, including vitamins, found in milk.

A few errors overlooked at the proof stage were noticed, and a random examination of the author index showed the omission of a name referred to in the text. In various places, the author's attempts at condensation of the material have made the style a little heavy and the meaning somewhat obscure. Generally, the excellent tendency in modern text-books towards a clear presentation of tables, diagrams and chemical formulae has been well maintained and the printing is good.

From the veterinary aspect, one would like to have seen a considerable expansion of the material dealing with the effect of disease on the composition of milk, especially the "metabolic disorders". There is no mention of any of the "acetone bodies" being normally present in milk, nor of the large increase of these bodies in the milk under various conditions of metabolic upset.

However, the material of the book is so complete that it should serve as a most valuable reference work for some years to come, and the author is to be congratulated on the highly successful result of a seemingly tremendous task.—A. EDEN.

NORTHROP, J. H. [Member of the Rockefeller Institute for Medical Research]. (1939). **Crystalline Enzymes. The Chemistry of Pepsin, Trypsin, and Bacteriophage.** pp. xv + 176. 48 figs., 85 tables. [Numerous refs.] New York: Columbia University Press. [8vo] [\$3.00].

The non-living character of enzymes was first shown by BUCHNER in 1897, but it was not until 1926 that an enzyme, urease, was first isolated in crystalline form by SUMNER [*J. biol. Chem.* **69**, 485]. The author and co-workers have isolated and crystallized pepsin, trypsin, chymotrypsin, and carboxypepsidase, while other workers have obtained catalase, amylase, ficin, pepsin and lysozyme, and the important respiratory ferment of WARBURG [(1933). *Biochem. Z.* **258**, 496.] has also been isolated. In all cases the protein nature of these enzymes has been demonstrated. As the author has played a big part in isolating many of these enzymes and made extensive investigations into their composition, chemical properties and reactions, this book by him, based on a series of lectures given at Columbia University presents a personal and detailed annotation on the present state of knowledge of their chemistry.

The scope of the book deals more specifically with work carried out by the author and his collaborators in New Jersey, with full discussion of cognate work by other authors. The general chemistry of enzymes is introductorily, yet thoroughly dealt with, followed by chapters devoted to:— pepsin; pepsinogen; chymo.-trypsinogen and chymo-trypsin; trypsinogen; trypsin and trypsin-inhibitor; carboxypeptidase, and finally, a consideration of bacteriophage, which although not yet isolated in crystalline form, has nevertheless been subjected to very exhaustive researches. The latter chapter could be most profitably perused by those working on bacteriological and virus problems. About one-fifth of the book comprises an appendix, giving full details of the preparation and crystallization of the enzymes. This excellent feature of keeping details of technique apart from the experimental work makes the book as a whole much more readable and comprehensible. Finally an extensive bibliography is given.

In a book of this type it might have been advisable to have included an equally full account of those enzymes which other workers have isolated, although the author could hardly have given the same personal touch to them. No doubt as more knowledge is gained the subject matter will have to be expanded, possibly much of the data modified when other workers bring their researches and considerations to bear upon the subject, but in the meantime the book should prove of immense value to those working in this field, since all the cognate knowledge distributed variably throughout the literature has been assembled therein, together with full details of technique. The general lay-out, diagrams, exposition and printing are very clear, and, in short, the book contains a wealth of knowledge, especially valuable to those working in the general field of enzyme studies.—A. E.

CLAY, H. H. [F.R.San.I., F.I.S.E., Fellow of the Sanitary Inspectors' Association, Assistant in the Division of Public Health, and Lecturer in Sanitary Engineering, London School of Hygiene and Tropical Medicine (University of London); Lecturer and Demonstrator to students at the Royal Sanitary Institute]. (1939). **The Sanitary Inspector's Handbook. A Manual for Sanitary Inspectors and other Public Health Officers.** pp. xxii + 528. 97 figs., numerous tables. London: H. K. Lewis. [4th Edit.] [8vo] [17s. 6d.] [See also *V.B.* **8**, 66].

This fourth edition was produced in response to demand for the last edition of 1937, and the opportunity has been taken to revise it in accordance with the terms of the Food and Drugs Act of 1938, extracts from which form the introductions to each chapter. Otherwise the book retains its previous form, except that it is longer by some 30 pages.

For reviews of previous editions the reader is referred to this *Bulletin*. **4**, 82, **6**, 680, and **8**, 66.—J. E.

LONG, P. H. [M.D., Associate Professor of Medicine, The School of Medicine, The Johns Hopkins University; Associate Physician, The Johns Hopkins Hospital; Lecturer in Epidemiology, The School of Hygiene and Public Health, The Johns Hopkins University], & BLISS, Eleanor, A. [Sc.D., Fellow in Medicine, The School of Medicine, The Johns Hopkins University]. (1939). **The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds.** pp. vii+319. 2 tables, 6 charts. [Numerous refs.] London: The Macmillan Company. [8vo] [15s. 6d.]

It is only about six years ago that the first communication on the clinical use of a drug of this series was made, but already a vast literature has accumulated and is still constantly growing. The present volume therefore comes at a very opportune time and very satisfactorily fills the need for a summing up of the literature.

After a short and interesting historical review the experimental work on the various drugs is described, and this is followed by a discussion of the toxic effects which may be produced in animals and man. A special addendum describes the renal complications which may follow the use of sulphapyridine. The large number of observations on the mode of action of the drugs are then critically discussed, and it is concluded that so far no theory has been evolved which adequately explains the mode of action of these sulphur-benzene derivatives. Nearly half the book is devoted to the clinical use of the drugs in medical and veterinary practice; their value in a number of conditions is now well recognized, but beneficial effects have been claimed in a large number of other conditions; in spite of the fact that much of this work has only appeared within the last year or two, the authors have succeeded in indicating very tersely which work appears to them valuable, and where further investigation is needed.

Each chapter contains a very good bibliography and the book ends with a comprehensive index. The chemical formulae of the main compounds are given in the very beginning. It undoubtedly deserves four stars.—J. M. ROBSON.

LEMAY, P. [Docteur de l'Université]. (1938). *Cancer et tréphones de Carrel.* [**Cancer and the Trephones of Carrel**]. pp. 132. [Numerous refs.] Paris: Librairie E. le François. [8vo] [Fr. 20].

In this short work L. explains his theory of the development of neoplasms on a basis of a disturbance of the equilibrium between the so-called "trephones" of Carrel (substances derived from undifferentiated tissue cells which stimulate neoplastic proliferation) and inhibitory substances in the blood serum. L. first published his views on this conception in 1924 and has amplified them in numerous articles in French journals since that date. Various chapters deal with such varying topics as eugenics, biophysics, cancer in insects etc., and the unorthodox views put forward can hardly be described here. Those interested should consult the original. References are given at the end of each chapter, but they refer almost entirely to French journals.—E. G. WHITE.





**Indian Agricultural Research Institute (Pusa)**  
**LIBRARY, NEW DELHI-110012**

This book can be issued on or before .....

Return Date	Return Date